NOVEMBER 19, 1956

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

Depreciation:

Industry can escape the maze caused by its own poor practices and government policies by: 1. More widespread use of modern accounting methods to boost returns on investment at least 10 per cent. 2. More common use of indexes to allow for inflation in the cost of depreciation. Result: A more realistic picture of profits.

— page 99

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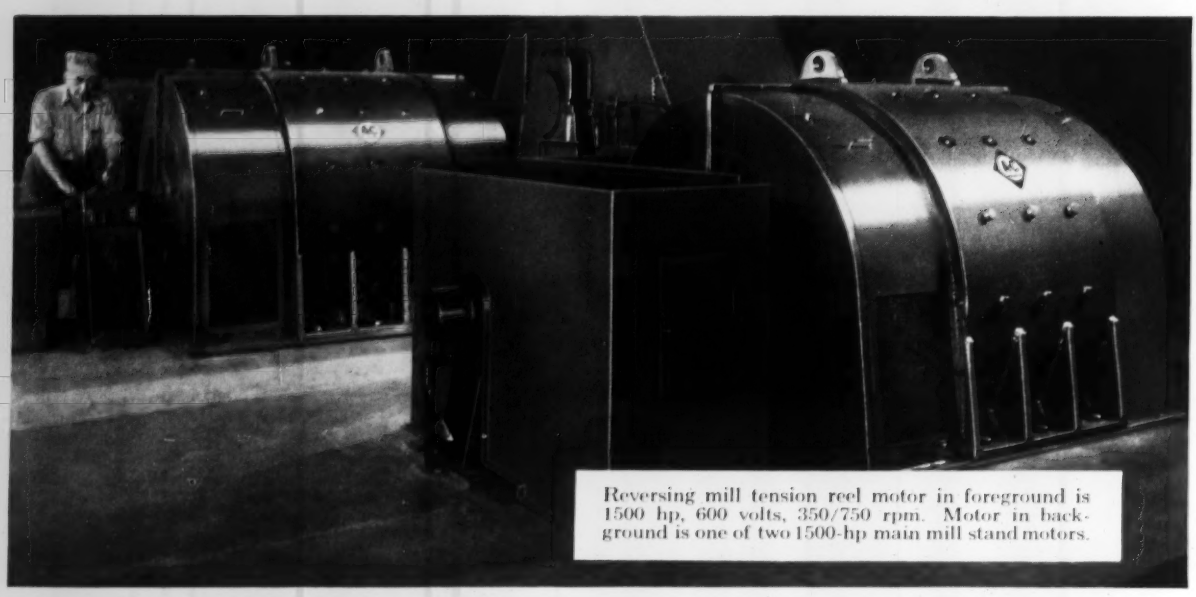
✔ How You Can Get Atomic Business. . .page 142

✔ Canners Turning from Sheets to Coils. . .page 211

ALLIS-CHALMERS
MOTORS

Furnishing All Drive Power for New Steel Facilities

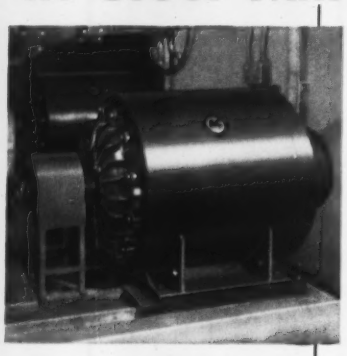


Reversing mill tension reel motor in foreground is 1500 hp, 600 volts, 350/750 rpm. Motor in background is one of two 1500-hp main mill stand motors.

Dependable Allis-Chalmers Motors Play Key Role in Steel Mill Expansion

Expansion recently completed in an eastern steel mill included two new processing lines and a new reversing mill. Allis-Chalmers application-engineered motors furnish dependable, economical drive power for these new specialized steel facilities — helping this major producer attain top steel yield.

For experienced help with *your* expansion or modernization plans, contact your local Allis-Chalmers office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Here are Allis-Chalmers 100-hp, tube-type, TEFC explosion-proof cage motors driving pumps in oil room below the reversing mill.

NOW, you get even more winding protection with SILCO-FLEX

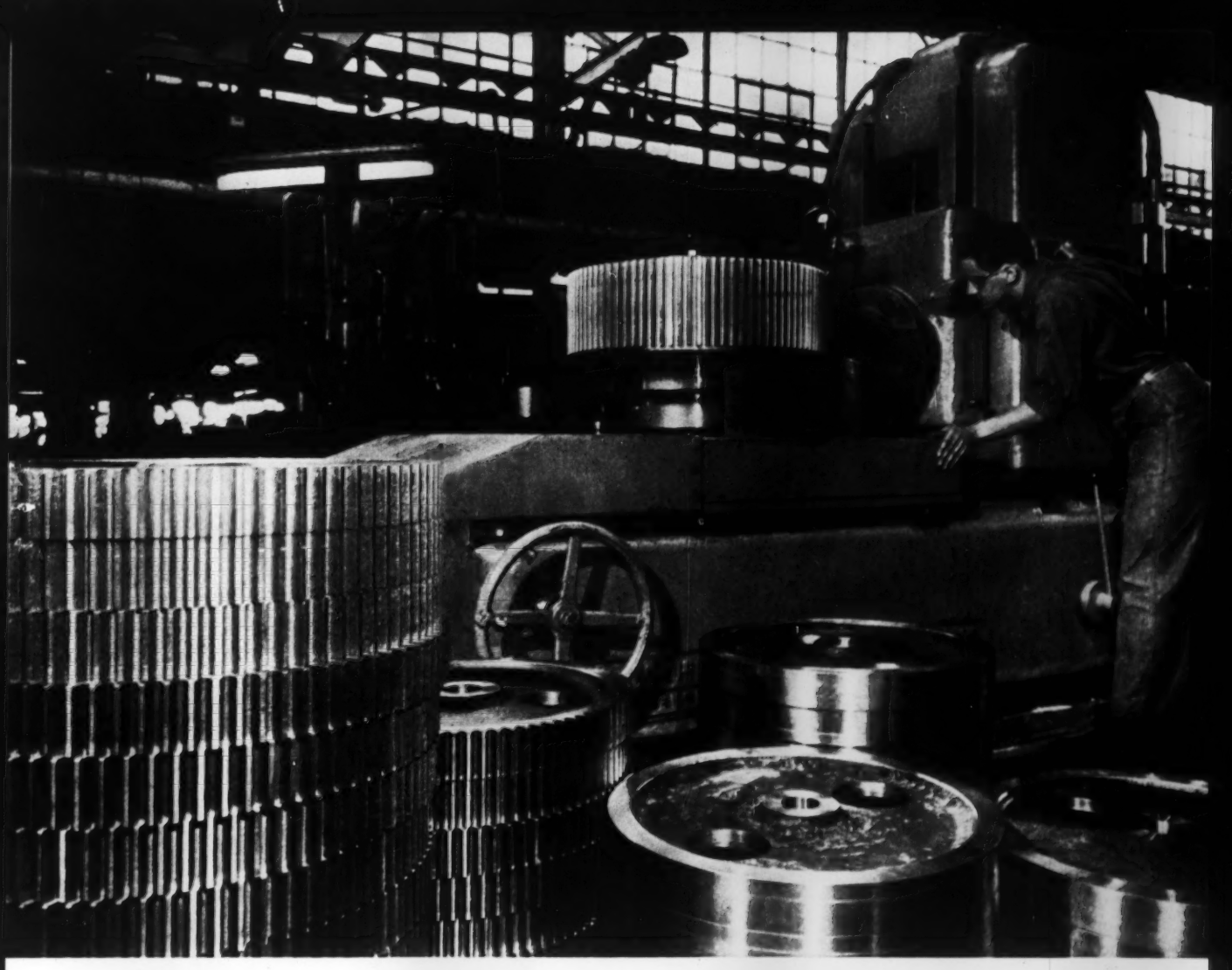
all-silicone-rubber motor insulation, available only on Allis-Chalmers motors — in many of the larger sizes. Ask your A-C representative for the facts about this revolutionary new insulation system.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5033



They Will Stand Close Inspection

The young man at the hobbing machine is merely giving his work an appraising look. Detailed inspection will come later, and it is safe to say that the verdict will be favorable. For this is the shop of The Adams Company, Dubuque, Ia., specialists in the art of making good gears.

Each of the gears in the photograph has 86 teeth; is 22 in. in diameter and weighs 153 lb finish-machined. Each is intended for use in heavy-duty excavating equipment. Four gears are machined at one time in the hobber, though you may have to look sharply to detect all four.

The gears are made from Bethlehem circular blanks. These blanks are both forged and rolled by a unique single-step method that insures great strength, uniform density, and regular grain flow. Blanks made by this process can be furnished in a wide variety of sections, and in sizes ranging from 10 to 42 in. OD.

Excellent for heavy-duty gears, Bethlehem blanks also have many other end uses—sheave wheels, crane wheels, flywheels, turbine rotors, pipe flanges, etc. Whether you manufacture gears or something else requiring circular blanks, we'd like the chance to send you full details. A letter, wire, or telephone call will bring the complete story to you promptly.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

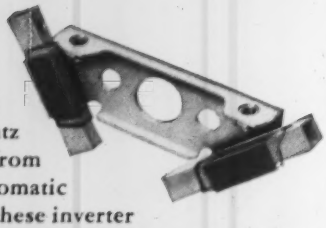
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

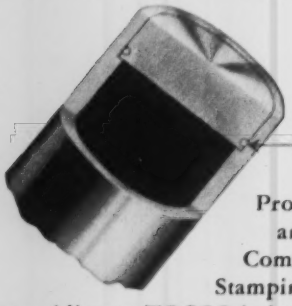
7 WAYS to SAVE MONEY with TOCCO* Induction Brazing

1



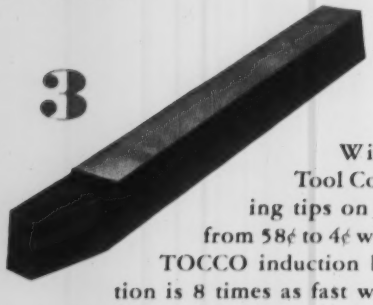
$15.84 per hour was saved by Jack & Heintz when they switched from torch brazing to automatic induction brazing of these inverter brush mounts. TOCCO brazing also upped production from 40 to 360 brazed assemblies per hour.

2



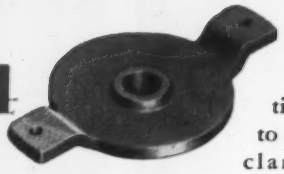
Production was doubled and cost cut 50% when Commercial Shearing and Stamping Company changed from welding to TOCCO induction brazing of these hydraulic cylinder assemblies. Heating time was cut from 15.3 minutes to 2 minutes on 5¼" cylinder shown here.

3



Willey's Carbide Tool Co. cut cost of brazing tips on large lathe tools from 58¢ to 4¢ when they adopted TOCCO induction brazing. Production is 8 times as fast with TOCCO—85 per hour, against 80 per day produced by a former method.

4



Formerly, Norris Thermador Corporation used arc welding to join this bushing and clamp. The change to TOCCO induction brazing reduced their costs 32%—from $46.44 to $31.73 per thousand parts.

5

When Mechanics Universal Joint Division of Borg-Warner shifted from welding to TOCCO induction brazing of this drive shaft assembly, they reduced the cost of the operation 67%. At the same time automatic TOCCO increased production from 11 to 45 pieces per hour—400% faster than the former method.

6

Packard engineers saved $1.74 per part when this automatic transmission shaft was redesigned from a forging to a steel shaft and casting, permitting the use of TOCCO induction brazing. In addition to this per part saving, $74,325 was saved in equipment and tooling.

7 Number 7—the lucky number—is up to you. Why not add your name to the list of companies who use TOCCO Induction Heating to increase production, improve products and lower costs. TOCCO engineers are ready to survey your plant for smililarly money-saving results—without obligation, of course.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-11, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering."

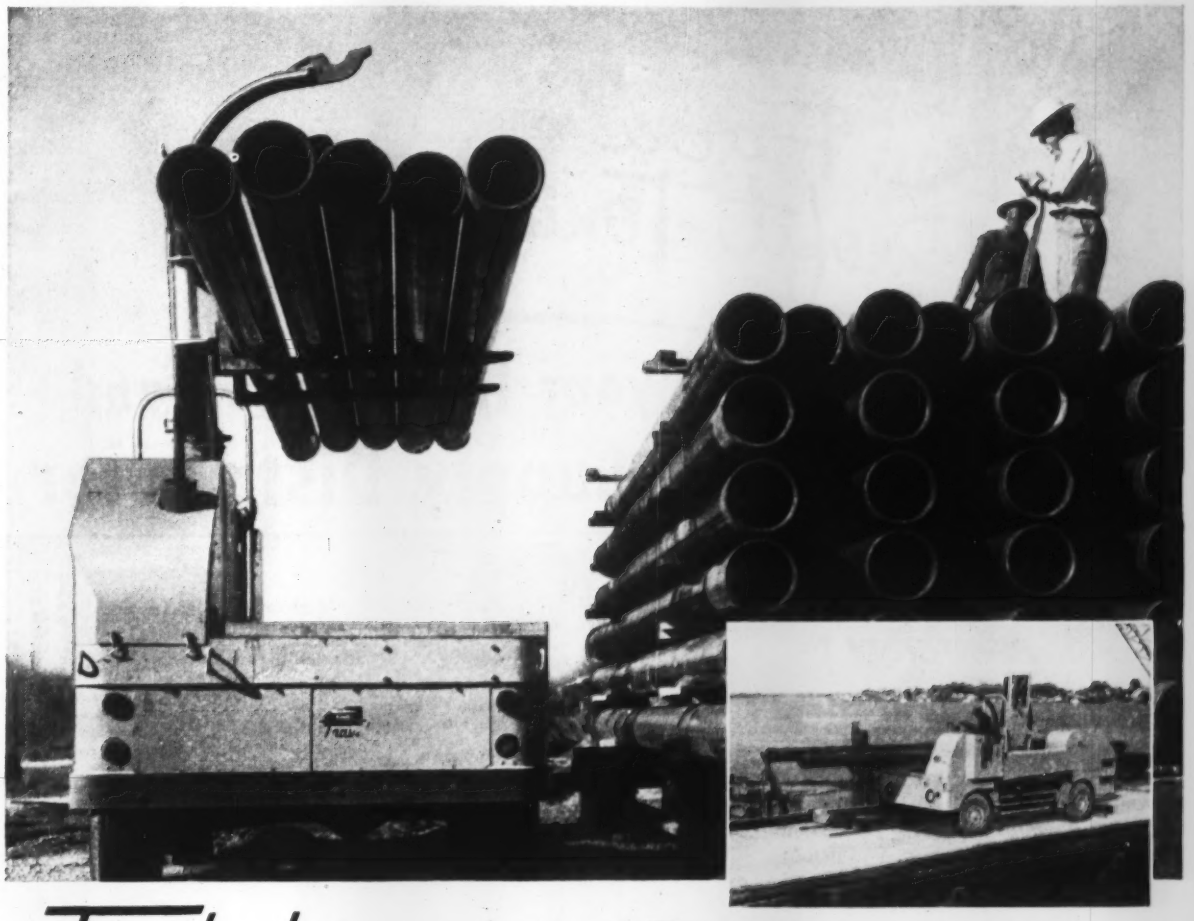
Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____



Traveloader replaces 3 trucks and releases 6 men for other work!

● A Traveloader is used by Kyle-Taylor Lumber Company, Berwick, La., to transport pipe from river dock to storage. It has replaced two pipe trailers and a gin-pole truck formerly used on this job, reduced man-power required from 15 to 9 and made time savings of about 70%.

This company, serving oil producers, receives pipe in barges at the river dock. A truck crane unloads and places the pipe on the dock. The Traveloader picks it up five lengths at a time, transports it to the storage yard, and stacks it neatly on racks for further disposition.

Time studies reveal the speed with which Traveloader works. Loading time at dock averages 35 seconds. Hauling to storage, stacking and returning to dock (round trip .55 miles) averages 3 minutes 8 seconds. The stacking part of this operation takes only 24 seconds! As a result the crane at the dock never has to wait for the Traveloader.

Since the company operates 24 hours, 7 days per week, the cost savings are substantial. Moreover, 6 more workers were made available without increasing payroll, and two less mechanized units require maintenance. "This machine is by far the finest that I have seen for handling pipe. It has doubled our capacity with less labor," says Mr. J. E. Kyle, Jr., Vice President.

Write for Bulletin 1360. It completely describes the remarkable TRAVELOADER that carries like a straddle truck, delivers like a road truck, and stacks like a fork truck.

Baker handling equipment

THE BAKER-RAULANG COMPANY

1259 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of Otis Elevator Company

6T2

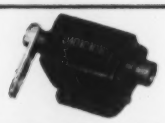
Rx: For a Profit-Tonic

Use your Imagination and your Industrial Supply Distributor

Let him help you COUNT your way to Lower-Cost Operation

When you come right down to it, how do you *know* . . . how can you be *sure* of anything . . . *unless you count?* And when you take a calculating look, you'll find that almost every machine, process and system in your plant can be more closely *Count*rolled . . . cost-wise . . . by the addition of Veeder-Root Counters that supply production, payroll, inventory and tax figures, plus a running check on mechanical performance.

It's easy to attach standard Veeder-Root Counters to existing equipment . . . as your Industrial Supply Distributor will show you. And if special counters are needed, he will bring a Veeder-Root engineer to consult with you. So call your distributor today . . . *he's a man you can count on.*



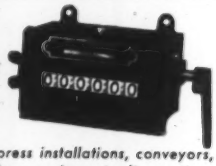
SMALL RESET COUNTER

A compact, rugged reset counter for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

Dimensions: 1¾" long, 1 19/64" high, 1 7/16" wide

Speed: Up to 1000 counts per minute.

BOX-TYPE RESET COUNTER



For punch press installations, conveyors, metal-working equipment, die casting, plastic-molding, rivet, spring and wire machining, or any installation requiring a heavy duty counter.

Dimensions: 4¼" long, 2 5/32" high, 3⅜" wide. Speed: 500 counts per minute.

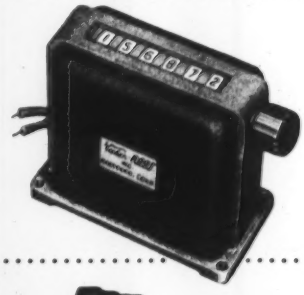
RESET MAGNETIC COUNTER

For remote indication of machine operation from plant to office.

Dimensions: 3 15/16" long, 2½" high, 1⅝" wide.

Speed: Up to 1000 counts per minute.

Coils: 110V-AC are standard. Other voltages are available. Panel mounting feature also available.

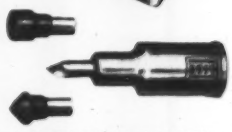


HAND TALLY

For quick spot-checks of production or performance.

Dimensions: 1 17/64" long (to end of reset knob), 1¾" deep, 2" high.

Counts one for each depression of the thumb lever, and resets to zero by a turn of the knob.



CLUTCH SPEED COUNTER

For checking to make sure that the machine is operating at the required R.P.M.

Dimensions: 3¼" long, ⅞" max. diameter. Non-Reset.

Internal clutch operates counter only when rubber tip is pressed against the shaft.

Insist on Standard

VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor

or write us on special problems

Everyone can count on

VEEDER-ROOT

'The Name that Counts'

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Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, O. Subscriptions in the U.S. and possessions, and Canada, $10 a year; all other countries, $20. Current issues, 50 cents each. Metalworking Yearbook issue, $2. Accepted as controlled circulation publication at Cleveland. Copyright, 1956, The Penton Publishing Co.

what's the scoop?

it's SEYMOUR NICKEL SILVER of course!

Take a close look at one of the "scoops" — or hooks — in the slide fasteners which play a key role in your daily living.

The *best* slide fastener scoops are made of Seymour Nickel Silver wire. They are formed on high speed machines that produce up to 300,000,000 tiny parts every day. Yet, so precise is the operation that tolerances are held to half-thousandths of an inch!

Because its uniform composition and temper enable it to undergo precise forming on high speed machines, Seymour Nickel Silver meets these requirements perfectly. It will not discolor materials — it is long wearing and corrosion resistant — it has the necessary eye appeal. Best of all, it has the *natural lubricity* which makes fasteners work smoothly and without sticking. These enviable qualities have helped make Seymour the leading supplier of nickel silver wire for the slide fastener industry.

Beyond that, Seymour's readiness to produce nickel silver alloys in strict conformity to users' needs has prompted many manufacturers to say . . . "SPECIFY SEYMOUR — You KNOW it's good!"

SEYMOUR

THE SEYMOUR MANUFACTURING CO.
3 Franklin Street, Seymour, Connecticut

(Advertisement)

CONFIDENTIAL

PLANT LOCATION FACTS

Where to find the labor skills you need

A suitable labor supply, with appropriate skills, is of prime importance in your plant location decisions.

Supplying all the facts about the labor potential at any site in New York State is our business. The data will be complete, accurate and current.

Our data will include a breakdown of the present industrial labor force by skills, sex and age groups, as well as an informed estimate of the percentage of the total labor force presently available. We also will provide characteristic regional rates for the specific job titles you will be considering or the ranges of rates for more general labor requirements. In addition, we will assemble for you a detailed history of labor-management relationships at any specific New York State locality.

Labor won't be your only consideration in deciding on a new plant location. You will want complete facts on markets, water, available sites or buildings, power, fuel, transportation and raw materials. And you will want information on these as they apply to the successful operation of a specific plant.

A tailor-made report

Any or all of the factors important to your analysis will be covered in a confidential report to you—tailored to your needs. It will be prepared by an experienced professional staff to cover either New York State locations of your choice, or, if you wish, sites which we will select on the basis of your needs.

Our booklet, "Industrial Location Services," explains what we can do for you. To get your free copy, write me at the New York State Department of Commerce, Room 672, 112 State Street, Albany 7, New York.

Edward T. Dickinson

EDWARD T. DICKINSON
COMMISSIONER OF COMMERCE

behind the scenes

An Amazing Cover

It sort of scares us to see a picture of a labyrinth on STEEL's refined and dedicated cover. A little reflection will remind you that the original labyrinth was associated with more scandal, horror, opprobrium, immorality, disgrace and heartbreak than any other symbol in Greek mythology. Consider the evidence: King Minos was made cuckold by a white bull, who became the father of a horrible creature called the Minotaur, who ate young Greeks without pepper or salt. Naturally, the king wasn't too crazy about this left-handed addition to his family, so he hid him in a labyrinth built by an early engineer and flyer named Daedalus. Now, this Minotaur had a half sister, Ariadne, who was nuts about a cat named Theseus, who knocked off the Minotaur following a sisterly betrayal. Ariadne and Theseus took it on the lam together, but after they were in the clear he dropped her. The whole affair was a mess.

Which brings us to Associate Managing Editor John Morgan's story on depreciation in this issue. (Depreciation Reform Still Needed). Essentially, depreciation means an orderly and reasonable tax write-off, but it has become so involved it baffles practically everybody but specialists. The confused character stumbling about in the labyrinth back there on this week's cover suggests many an owner of industrial equipment. Government rulings, inflation and complex accounting combine to lose him in a maze.

Confused Beginnings

"Most of the confusion began back in the early 1930s," Morgan explained, when we asked him for a rundown on the story. "It started as a taxing device, a dodge to raise money without going to the Congress. Its results are widespread, but not too well known or understood. Tight capital, for instance, stems partly from our depreciation practice."

In all the business press, STEEL is the only periodical that has consistently explored and publicized the depreciation problem. It may be that Morgan's is one of the few voices crying in the wilderness, but it also may be that if he keeps hammering away at this subject, he will eventually stir up the publicity it deserves; and when it draws enough publicity, corrective action may be taken.

Add Political Losses

Gambling is wicked. Moreover, the Scottish corpuscles in our mixed blood cry out against wagering on anything except a sure thing, so that's why, when we risked a dollar on a man named Eisenhower, we were filled with mixed emotions. Some refugees from the Kefauver investigation days, hiding out as STEEL staffers, cooked up a deal appealing to spirited individuals who were willing to back their judgment with cash. The only thing required from each investor was a prediction of the winning presidential candidate, together with the precise number of electoral votes he might harvest.

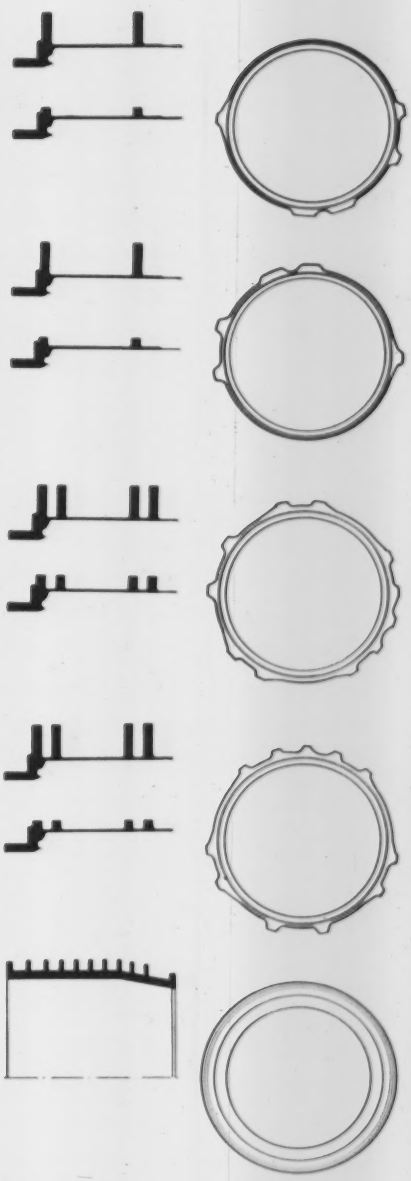
We cautiously invested the dollar, predicted Eisenhower would win with 405 electoral votes, then suffered the fate of most gamblers: Louisiana, Texas, Tennessee and West Virginia lowered the boom on us. Assistant Editors Ross Whitehead and John Botzum split the pot, each one off by 2 votes, up and down.

Linking Pappy's Chain

Charles R. Gibbs, technical adviser, Revere Copper & Brass Inc., Rome, N. Y., tells us that Penurious Pedro was obliged to trim 0.967 ft from each side of his rug to make it fit his floor. Mr. Gibbs said he was too tired to work that out in inches, and we don't blame him. Well, brother Gibbs, here is a little teaser. Pedro's pappy, foxy Felipe, had six sections of chain, each consisting of four links. He wanted it made into one chain. The village blacksmith told him it would cost 10 cents to cut open one link, and 25 cents to weld it together again. What do you suppose foxy Felipe paid for his complete chain?

Shrdlu

STEEL



Typical ring sections and profiles showing lug configurations in a smaller scale.

STAINLESS STATOR RINGS

One of Cameron's most interesting contributions to military and commercial air-power today is the production of forged, stainless steel, stator rings. Our unique processes make possible precision forgings with odd lug configurations, large diameters and a vastly superior grain structure. Shapes and sizes heretofore costly to produce as a forging are now sound economy at Cameron.

The study of specialized alloys to meet the extreme demands of today and to anticipate those of tomorrow parallels forging production and is a part of our progress.

Investigate these advantages — write or call . . . . .

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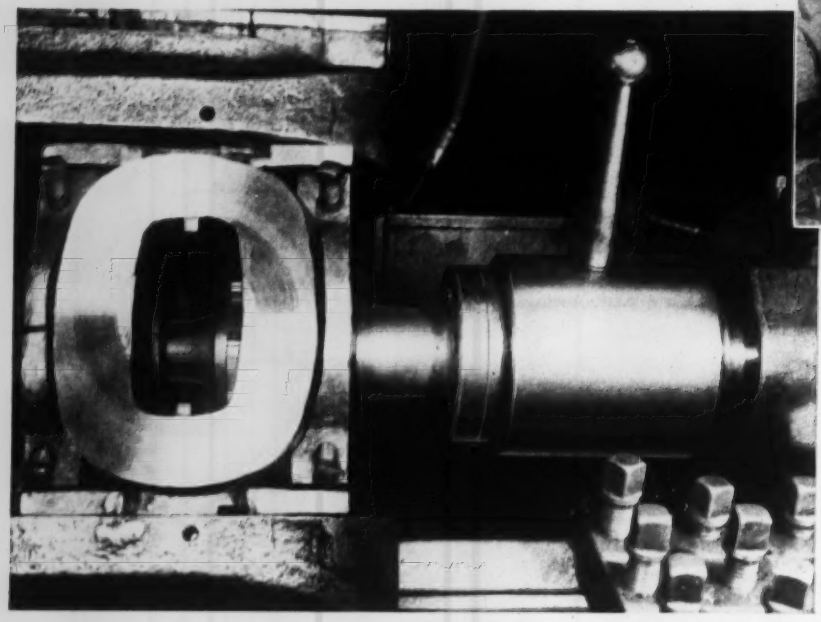

Tapping threads *from inside out*

Seats are tapped in gate valves by using LANDIS Valve Taps, even though the diameter of the thread exceeds that of the valve port.

The use of a 6 VB LANDIS Valve Tap at the Kerotest Mfg. Co., Pittsburgh, Pa. illustrates the method and results of this operation. Specifications require 5" 12-pitch UN threads cut 5/8" long to Class 3 fit in 4" steel body castings.

Even though the seat thread diameter exceeds that of the valve port, the "collapsing action" of the tap (which withdraws the chasers into the head) gives sufficient clearance to move the tap into the port. The chasers are then expanded (from 3/4" on smaller taps to 2" on larger sizes) within the valve body, and threads are tapped outward as the lathe carriage is moved rearward by the leadscrew. (Note: Special chasers are available on certain of these operations that enable threading the opposing seats without removing the tap from the valve body.) After completing the thread, the tap is again collapsed and withdrawn.

Threads are cut at 12 R.P.M., and 100 threads are completed before regrinding the chasers. Each set of chasers produces an average of 700 pieces, excellent life with the short throat or chamfer required in this particular operation. Operation of the tap is by hand, and the valve body must be indexed 180° to thread the opposing seat.

LANDIS Valve Taps are available for diameters from 2" to 24", and each tap body can be equipped with tap heads of various sizes to thread many different seat diameters. Note that these taps feature a tapered head, of great value where valve seats are inclined at an angle to the port opening. This allows tipping the valve body into threading position after the tap has entered the port. More information on request—please send drawings.

438

LANDIS *Machine* COMPANY | **WAYNESBORO PENNSYLVANIA**

IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil – *without making any other changes* – can cut leakage an average of 35%...sometimes 90%!

SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac® lubricating oil solved these problems.

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-11.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

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at Less Cost with

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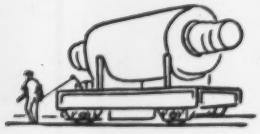

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64-TON ELECTRIC FLAT CAR

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THE ATLAS CAR & MFG. CO.

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LETTERS
TO THE EDITORS

STEEL: Foremost in Field

In the Oct. 15 issue, I noticed two interesting articles, "Metalworking Tackles the Satellite" (page 120) and "Fabricates Giant Reactor Vessel" (page 135). I would appreciate copies. Your magazine, in my opinion, is one of the foremost in its field.

Kenneth B. Oelschlager
Superior Tube Co.
Collegeville, Pa.

Inspiration for Editorial

Your editorial, "Get Out the Vote" (Sept. 24, page 63), inspired us to publish a similar editorial in our house publication, *The Rocket*.

Since your excellent magazine is no doubt read by advertising managers, public relations directors and house-organ editors, another answer to your question ("What can be done to get out the vote?") would be: Editorialize in your house publications—both internally and externally. While we don't know what the total house-publication readership is, it must be many millions.

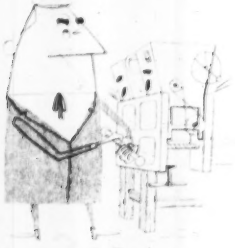
L. W. Bennett
Editor-in-Chief
The Rocket
Reaction Motors Inc.
Denville, N. J.

Pleasant Discovery

Quite by accident I came across the article, "Extra Hands for Engineers" (May 7, page 53). It is an excellent article, and those of us who are active in the technical institute movement appreciate such publicity. May I have a reprint?

K. L. Burroughs
President
Aeronautical University Inc.
Chicago

35 Problems To Be Solved



Under the subhead, "Washington Whispers," in your Windows of Washington column (Oct. 22, page 52), you mention that the Defense department has asked for help in solving 35 new technical problems.

Since your readers will undoubtedly want to know where a list of these problems may be obtained, I suggest they send for the *Information Bulletin* for general information on procedure and for *Technical Problems Affecting National Defense* which lists these problems. Write: National Inventors Council, Department of Commerce, Washington 25, D. C.

The Inventors Council is the focal

(Please turn to page 12)

Vacuum Reward

5000 CFM

Free Air Displacement

New Kinney® Model KMB-5000 Two-Stage Mechanical Booster Vacuum Pump Boon to Vacuum Metallurgy!!

Metallurgical vacuum processing has proven that it can furnish the superior metals required to meet the demands of science and modern industry . . . and with the realization of its potentials has become a major process. Industrial progress will not permit any vital process to remain small, so Kinney engineers have designed the new Model KMB-5000 to meet anticipated needs.

The Model KMB-5000 design is similar to smaller Kinney versions that revolutionized vacuum performance with a truly unique principle of operation . . . that of backing up a positive displacement, lobe type rotary pump with a Kinney cam and piston high vacuum pump. This combination delivers an ultimate pressure (McLeod Gauge) of 0.1 Micron, produces the highest volumetric efficiency, and yields the highest dollar return per CFM available in any high vacuum pumping system. Design also provides cleaner pumping action (prevents back-streaming of oil vapors into vacuum system), and since positive displacement from atmospheric pressure to the ultimate pressure is featured, it does not have the blocking pressure limitation of a vapor stream booster pump.

The Model KMB-5000 operates at 1800 RPM (normal pump speed) driven by a 50 HP motor. The 2½" diameter shaft is mechanically sealed. It has a 16" flanged inlet connection, and a 6" flanged outlet connection. The approximate weight of pump only is 3000 pounds.

For further information, contact one of our competently staffed district offices . . . in Baltimore, Charleston, W. Va., Charlotte, N. C., Chicago (La Grange), Cleveland, Detroit, Houston, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, San Francisco . . . or The International Sales Office, 90 West Street, New York 6, N. Y. Our engineers will gladly make recommendations on your particular vacuum equipment needs.

For superior vacuum equipment, contact the Vacuum Equipment Division of The New York Air Brake Company at the address below.

WRITE NOW! ----------

KINNEY MFG. DIVISION
THE NEW YORK AIR BRAKE COMPANY
3841 WASHINGTON STREET • BOSTON 30 • MASS.
INTERNATIONAL SALES OFFICE 90 WEST ST. NEW YORK 6, N.Y.

• Please send complete data on the new Kinney KMB-5000 Mechanical Booster Vacuum Pump.

Name _____ Title _____

Company _____

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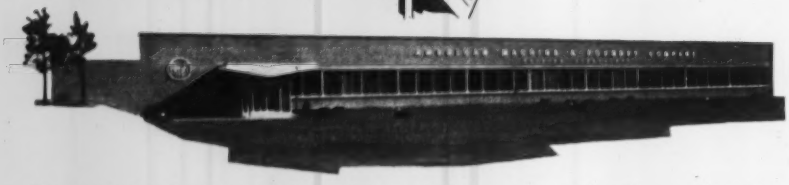
typifies the opportunities for modern science industries in

NORTH CAROLINA



One of the South's most modern industrial research and development facilities . . . with electrical, mechanical and electrochemical sections . . . is operated in North Carolina by American Machine & Foundry Company.

This laboratory has grown rapidly since its establishment in 1951 and now occupies a new building with room for still further expansion.

Product design and development here range from high-speed automatic machinery to high power silver-zinc batteries for guided missiles, some smaller than a cigarette package.

Engineering and scientific skills for modern science industries are expanding in North Carolina.

In the center of the State is the outstanding Research Triangle area of the University of North Carolina, N. C. State College and Duke University.

AMF and other leaders find substantial advantages in this research atmosphere, so accessible to advisory talents, experimental instruments, and graduates who prefer to live and work in North Carolina.

NEW

32-page illustrated editorial survey "NORTH CAROLINA'S SECRET WEAPON". *A wealth of up-to-date industrial information. Sent on request.*

Progressive companies in diverse fields are welcomed by a business-like State government and friendly communities. Interesting and helpful information for expanding companies is contained in a newly published editorial survey of the remarkable industrial growth of North Carolina. Phone, wire or write in confidence for a copy.

William P. Saunders, *Director*
DEPT. of CONSERVATION AND DEVELOPMENT
Raleigh 10, North Carolina

NORTH CAROLINA
YEAR 'ROUND MID-SOUTH

LETTERS

(Concluded from page 10)

point for this program. It is our responsibility to see that proposals of merit are steered to the appropriate branch of the military.

Morris M. Sparks
Technical Staff
National Inventors Council
Department of Commerce
Washington

Screw Machine Story Lauded

In your Oct. 29 issue, we came upon the article, "Machining Aluminum on Automatics" (page 134). We believe this to be one of the best written and informative articles we have had the opportunity to read for some time.

We would appreciate three copies for distribution to our department supervisors.

Sheila J. Brown
H & H Screw Products Inc.
Buffalo

Reprints Go to Sales Force

I have read your article, "Check Small Accounts' Cost" (Oct. 15, page 80), with interest. I would like a dozen copies for distribution to our sales force.

Al Patnik
Manager-Dealer Sales
Lincoln Electric Co.
Cleveland

Program for Automation

Kindly send a half dozen copies of the article, "Automation—Bogeyman or Bonanza?" (Oct. 15, page 109).

I found the article interesting. With the copies requested, I hope to place before management a comprehensive program for automation.

Edwin B. Greene
Project Engineer
Eastwood-Nealley Corp.
Belleville, N. J.

Fine Coverage of Alloys

We are interested in obtaining 500 copies of your Metal Selector (insert in the Oct. 1 issue).

You are to be congratulated on the fine coverage of alloys and the practical information you have included.

It is our intention to supply each of our customers with a copy of this information.

F. Kenneth Iverson
Manager of Sales
Cannon-Muskegon
Muskegon, Mich.

AMA Reprints STEEL Story

We were interested in the article, "Better Communication Needed as Metalworking Goes to Market" (May 14, page 107), as reprinted in the September, 1956, issue of the American Management Association's *Management Review*.

May we have permission to reprint this article in *Sales Excerpts from Experts*, our sales bulletin? It is read by 900 sales executives of member firms who manufacture and distribute equipment and supplies for the laundry and dry cleaning fields.

Cooke O'Neal
Laundry & Cleaners Allied Trades Association
New York

• *Permission granted.*

AUTOMATION has a heart of COPPER!

MULTRA Automatic Assembly Machine used in production of P. R. Mallory Mercury Batteries

You might say, copper is what makes automation workable.

For automation depends on undistorted signals. Signals to indicators . . . to recording instruments . . . to control devices.

Such signals may be electrical, pneumatic or hydraulic. Thus, they must be conveyed either by wiring or by tubing.

And that means COPPER.

When the signals are transmitted as electrical impulses, over wires and cables, copper's outstanding conductivity makes it practically *indispensable*.

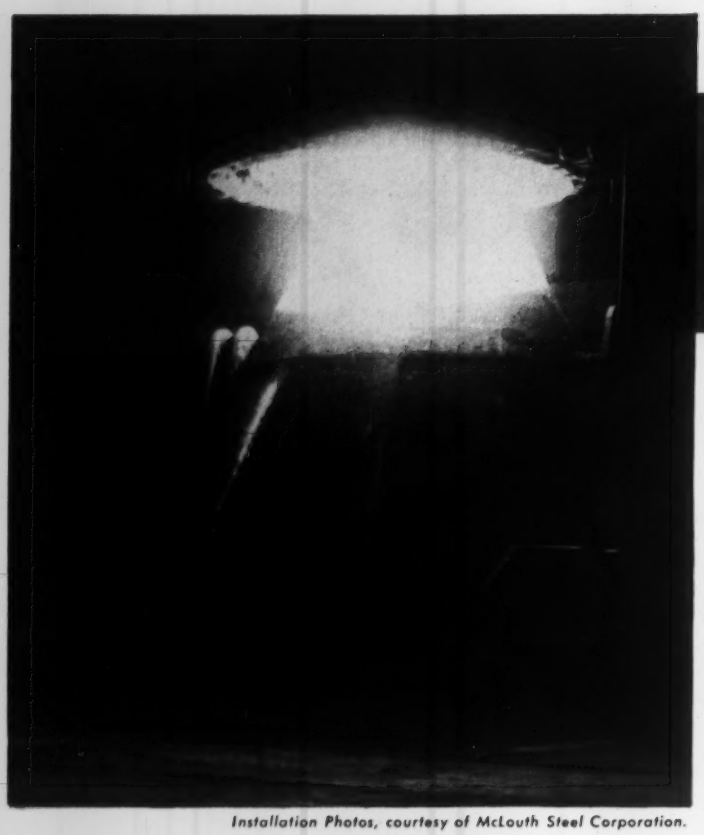
When the signals are conveyed by liquids or gases, copper makes the necessary tubing smooth, flexible, easily joined to instruments.

Wherever you find automation at work today, at the *heart* of the automatic controls you find *COPPER*. For its characteristics are unmatched by any substitute.

As automation is essential to progress, so COPPER is essential to automation.

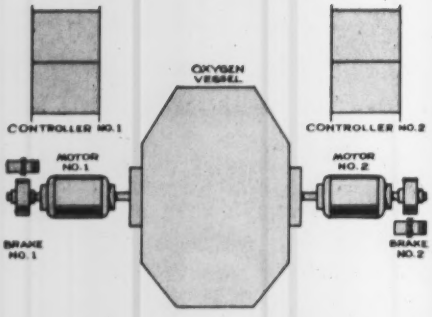
COPPER & BRASS
RESEARCH ASSOCIATION
420 Lexington Avenue, New York 17

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing



Installation Photos, courtesy of McLouth Steel Corporation.

ANOTHER FIRST BY EC&M...

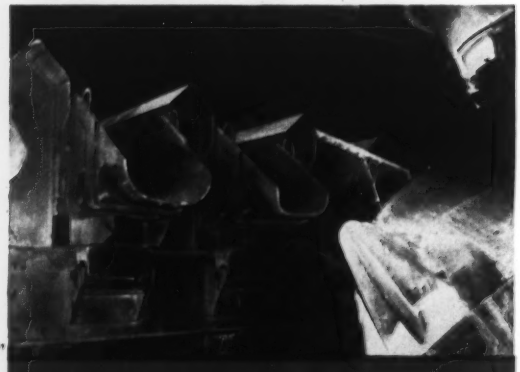


STEEL IN MINUTES FROM SCRAP AND HOT METAL

Photo "A" shows the scrap car charging scrap into the tilted oxygen vessel. The hoppers on these cars are also used for carrying other additives to the converter. When charging Hot Metal, as in Photo "B", the ladle and the vessel are tilted in unison toward each other for accurate metal transfer.

All operations (tilt and propel) of these cars are EC&M Controlled. Propel motions are also equipped with EC&M Type WB Brakes.

The first Oxygen Converter installation in the United States was built by Pennsylvania Engineering Corp. and is EC&M controlled.



"A"

"B"

ELECTRIC MOTOR CONTROL FOR OXYGEN CONVERTERS

For simplicity and maximum safety . . . the scrap car, hot metal car and oxygen vessel tilt, shown here, are equipped with constant potential drives using series wound motors and series brakes.

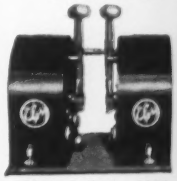
EC&M Magnetic Controllers provide maximum dependability for all drives and maintain high production under the safest conditions.

We invite you to discuss control for this newest hot metal application at your convenience. Call an **EC&M** engineer to learn the advantages of this safe, low-cost control for hot metal handling.

HOT METAL poured from converter vessel into ladle-car below. EC&M Control provides slow speed to avoid spills . . . to permit safe pouring speeds.

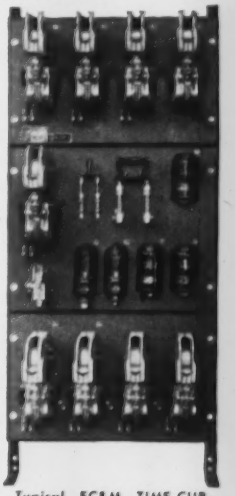
CONTROL APPARATUS WITH A REPUTATION FOR SAFE HANDLING OF HOT MOLTEN METAL

2 BRAKES
2 MOTORS
2 CONTROLLERS
2 MASTER SWITCHES



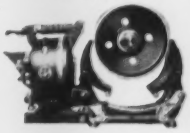
EC&M Bulletin 1190 Cam Master Switches, mechanically connected by quickly detachable coupling.

EC&M Bulletin 1110-2 Rotating Cam Limit Switch for car-ladle tilt.

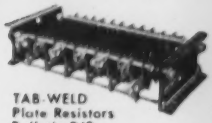


Typical EC&M TIME-CURRENT Controller for Hot Molten Metal Service. Of the Reversing-Plugging Type, with Armature shunt slow-down on first point.

EC&M Bulletin 1110-1 Type E Limit Switch for car positioning.



EC&M Type WB Brake with 2 separate series windings, one for each motor circuit.



TAB-WELD Plate Resistors Bulletin 942

This EC&M Control System avoids dangerous spills, because each motor circuit is electrically independent, and separate controllers are operated from a double Master Switch with quickly detachable coupling. Should one motor fail . . . no knife, transfer or disconnect switches need be operated to continue operation with one motor.

SQUARE D COMPANY
EC&M DIVISION • CLEVELAND 28, OHIO

6822

. . or Released in an Instant

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Bolt threads are gripped tightly . . . these famous nuts *never* work loose. Yet an ordinary hand wrench gives instant release. The tough, built-in GREERCOID collar does it . . . and seals against fluid leakage, too!

Study *your* fastener problem. Over 3000 types and sizes. Consult GREER. Proved on thousands of products. Meets gov't and military specifications.

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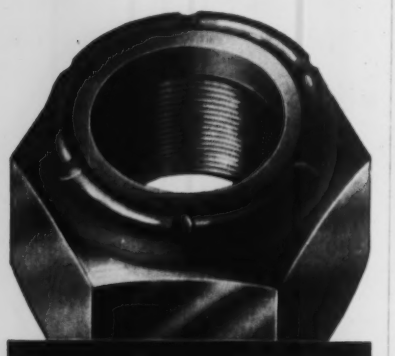
GREER STOP NUT CO.
2620 Flournoy Chicago 12, Ill.



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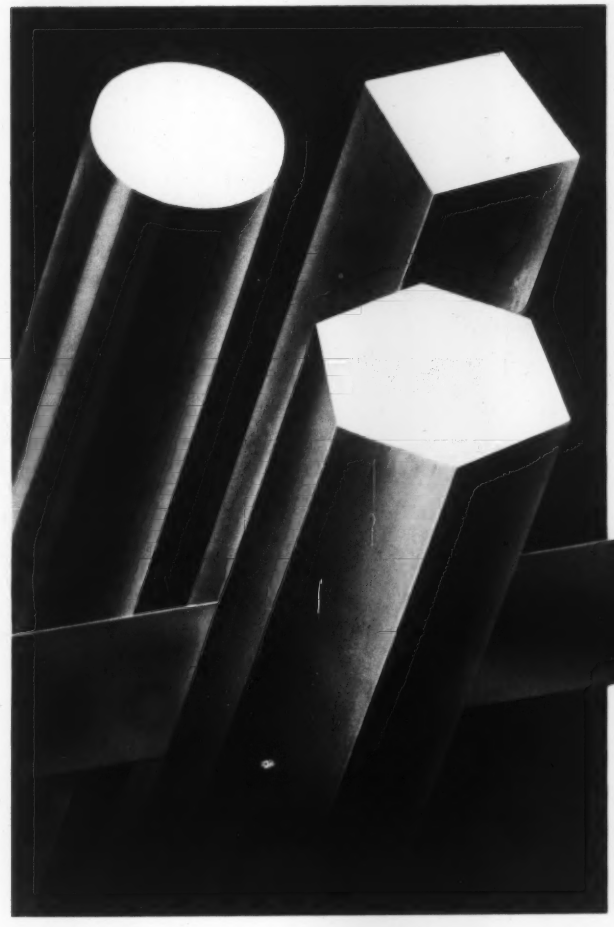
USS MX — fastest free-machining screw stock — at no extra cost!



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- The grade of each lot is clearly marked on the seal!
- Takes the guesswork out of bar selection—lessens the chance of mistakes—saves time all along the line!
- Another reason why U. S. STEEL SUPPLY is the place to buy!

Quick delivery from our nearest warehouse puts you in position to cash in on many advantages of this remarkable screw stock!

If you are interested in turning out more parts per hour, switch to USS MX Free-Machining Screw Steel. This is possible because MX will take cutting speeds up to 50% higher than with regular Bessemer grades. This faster machinability has enabled hundreds of shops to boost production from 10 to 50%. And they have gotten up to 200% longer tool life. This means that MX will cut the cost of any part you now machine from ordinary screw stock.

You pay no more for these benefits. By increasing the rate of production, MX lowers the cost per part . . . by prolonging tool life, MX reduces down time . . . by assuring better finish, MX eliminates extra finishing operations . . . and by providing closer dimensional accuracy, MX helps to eliminate rejects.

U. S. Steel Supply can give you quick delivery on this remarkable screw stock in both Bessemer and Open Hearth Grades . . . in all the popular sizes and shapes. In addition, each lot in your order is neatly strapped and the seal identifies the lot as to grade. This is what we mean when we say "Grade Mark Service." It saves you time in identifying and stocking screw stock you buy from U. S. Steel Supply. All orders filled from warehouse nearest point of delivery.

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UNITED STATES STEEL

"This forging lost 33 tons along

says **Joseph Lacey,**
Supt. of Machine Shops
USS Homestead
Forgings Division

It was during the First World War, 38 years ago, that Joseph Lacey first toted his lunchbox as an apprentice machinist for United States Steel. He is now master of industrial machining, and has been entrusted with a large crew of machinists, inspectors and other experts who make USS Quality Forgings.

Visitors are always intrigued by the great difference between the ingot weight and the shipped weight of the forging. The picture, for example, shows a power station turbine rotor, one of our specialties. Forgings of this type have as much as 65% metal loss from ingot to shipped weight. Where and why did it go?

The nature of open die press forging on large ingots is such that considerable stock must be left on the various diameters of a contour forging. Top and bottom "crop" losses at the press, depending on various metallurgical factors such as ingot size and design, account for a considerable percentage of metal loss. However, other than "crop" losses, the open die press cannot remove large amounts of metal—this must be done in the machine shop.

When the forging arrives at the machine shop, special carbide tooling permits large amounts of steel to be "hogged off" through the use of high speeds and feeds and heavy cuts. This is known in the forging business as rough machining—fast removal of large amounts of metal. Rough machining is often accomplished in two stages—before and after heat treatment for physical properties. When specified, large masses of metal are removed in the preliminary rough machining operation known as "barking." After heat treatment, the machinist must "final rough machine" with sufficient stock allowance to permit the customer to finish the job to size in his machine shop.

So you can't skimp on steel if you want a superlative job—like a USS Quality Forging. A liberal, non-penny-pinching approach is needed, and that's what you get from United States Steel. Why not write for a free copy of our 32-page booklet that describes USS Quality Forgings? Address inquiries and booklet requests to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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forged steel rolls and back-up roll sleeves
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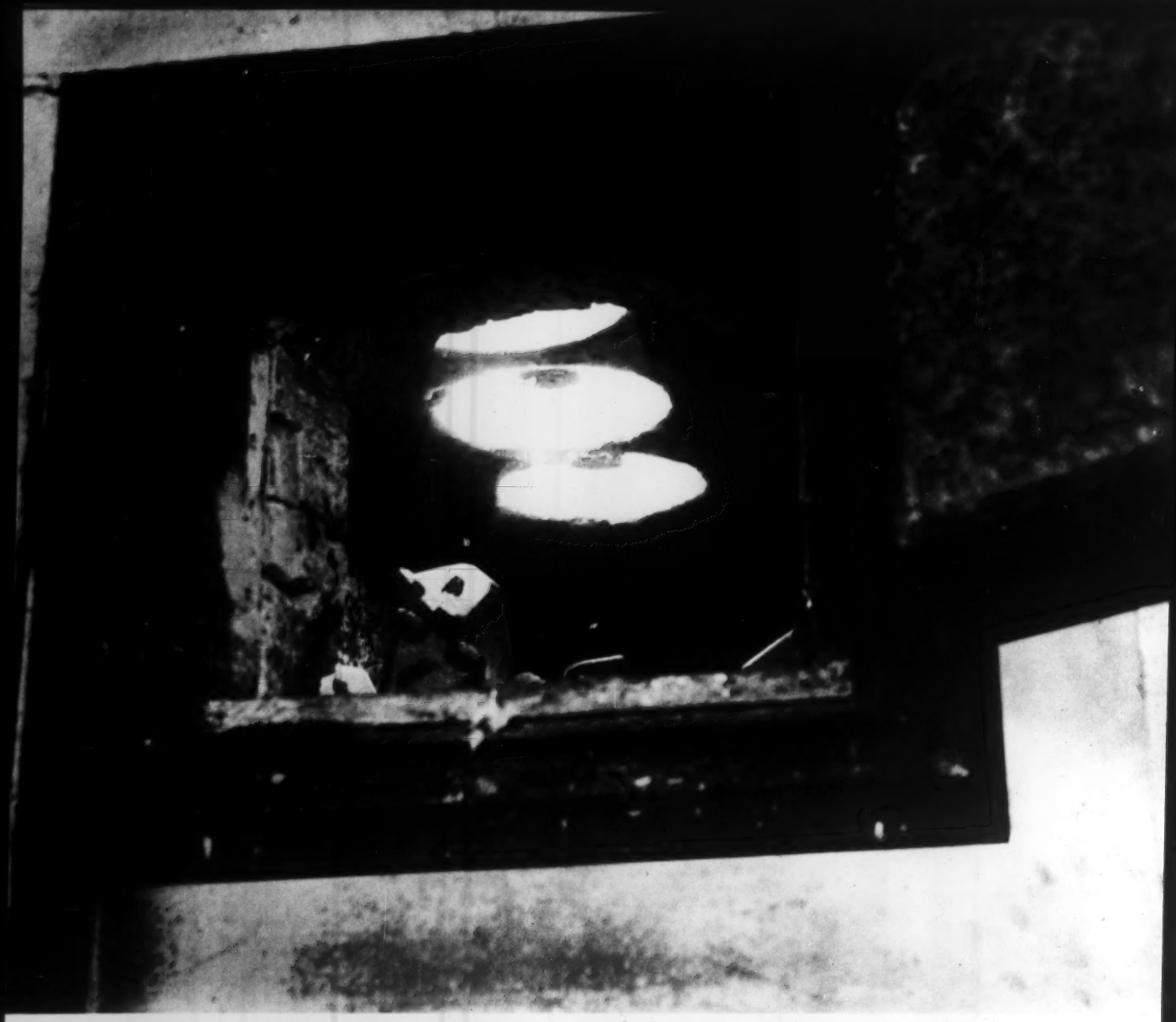
UNITED STATES STEEL



Roof arch of aluminum-melting furnace being fired up at Doehler-Jarvis Division of National Lead Company, Pottstown, Pennsylvania. "Steel Cast," a castable refractory containing Lumnite cement, made by Laclede-Christy Division, H. K. Porter Company, Inc., replaced brick arch roofs in 31 furnaces. Refractory-concrete roof arches reported in excellent condition after two years of service.

Furnace Refractories give top performance with **Lumnite*** Concrete.

In job after job, where extreme temperatures and thermal shock are encountered, experience has shown that Refractory concrete made with Lumnite cement will give excellent service in aluminum-melting furnaces, also in other furnaces of many types, large and small.

Refractory concrete can be easily placed, using your own plant work force. Service strength is reached within 24 hours. A convenient way to make Refractory concrete is with castables. These are packaged mixes of Lumnite calcium-aluminate cement and selected aggregates designed for your specific job. They are prepared and distributed by leading manufacturers of refractories.

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL (USS) CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

* "LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

L-135

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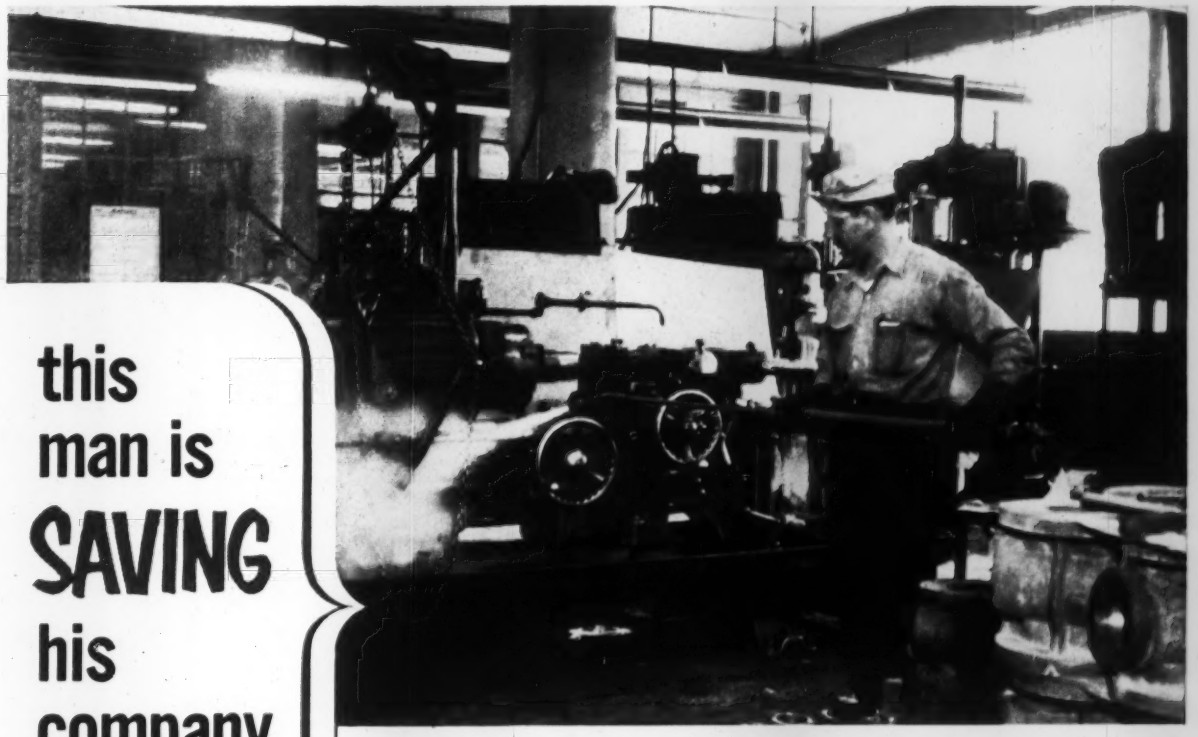
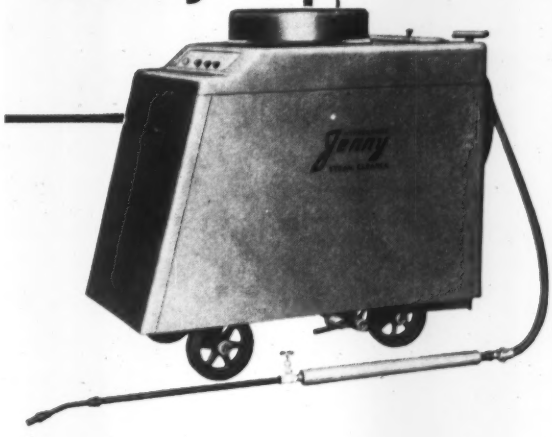
United States Steel Hour—Televised on alternate Wednesdays—See your local newspaper for time and station



this man is SAVING his company money...

SPEEDING PRODUCTION



He's stripping oily grime from machine tools with Hypressure Jenny *before repairs or repainting.* He's *saving his company* money, because he is doing the job in one-sixth of the time taken by hand methods. Also it is a known fact that when mechanics work on clean equipment, unhampered by grease and grime, production steps up . . . job time is shortened . . . costs are reduced.

But that's only half of it!

Besides cleaning all types of production machinery, tools and equipment, Jenny saves up to 90% of the time and labor costs of cleaning floors, walls, windows, and lavatories . . . reduces fire hazard; increases plant safety; and speeds production through better working conditions.

If you would like to know more about HYPRESSURE JENNY STEAM CLEANER and the many ways it can save your company money . . .

WRITE, OR MAIL THE COUPON TODAY! No Obligation.

HYPRESSURE Jenny STEAM CLEANER

Without obligation send me complete information on HYPRESSURE JENNY STEAM CLEANER

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Company _____

Address _____

City _____ State _____

HYPRESSURE JENNY DIVISION
HOMESTEAD VALVE MANUFACTURING COMPANY
P. O. BOX 22 *"Serving Since 1892"* CORAOPOLIS, PA., U.S.A.

are you running hard...

Conservative studies of growth potentials and long range trends, by both industry and government, show clearly that markets are already outrunning the labor supply for industrial production. The pace will get increasingly faster as our growing population demands more goods and services.

Those companies which stay in the race will do so by stepping up their productivity per man hour, and planning their capital expenditures accordingly. They will not stumble over the problem of machines displacing men, because they know there will not be enough labor to fill all the jobs created in the next ten years.

Avey production machines have already increased productivity per man hour, per square foot of plant space, and per dollar of invested capital in many plants. Their fast rate of return makes it profitable and pleasant to stay in the running.

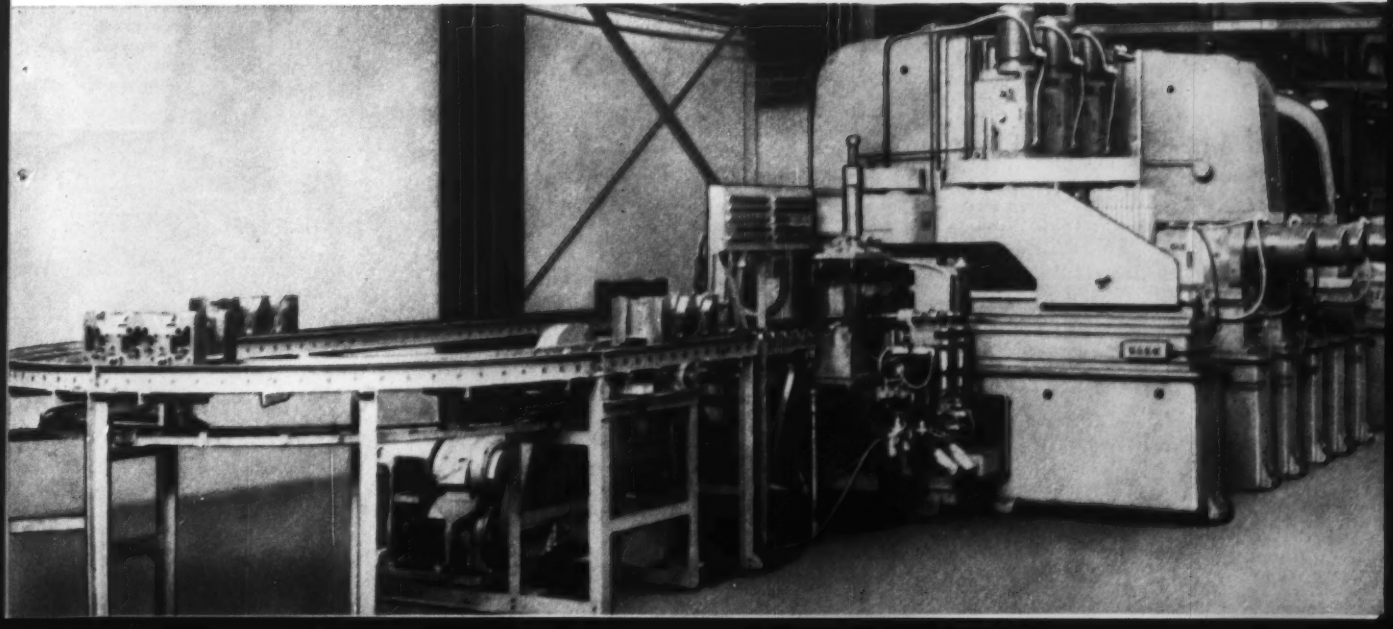
▸ **production data:** This machine automatically rough and finish mills, drills, countersinks, and taps 260 hydraulic pump covers per hour. Operations include automatic gauging, probing, and insertion of bronze bushing in bore.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

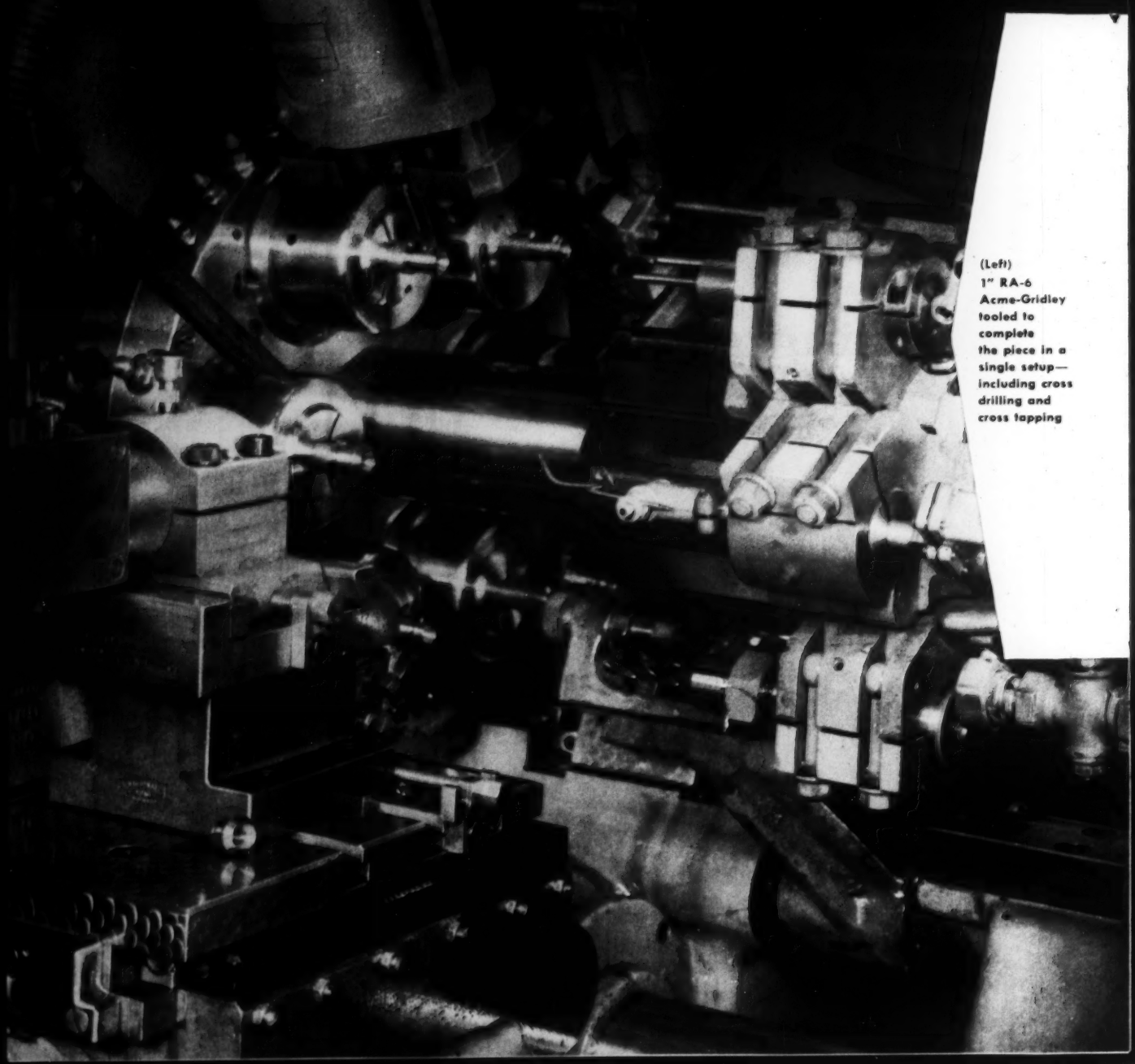
drilling, tapping, production machines

and losing ground?

Avey



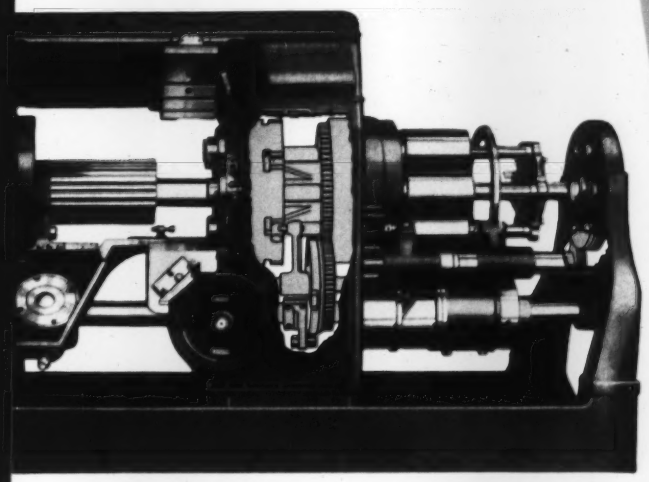
Acme-Gridley



(Left)
1" RA-6
Acme-Gridley
tooled to
complete
the piece in a
single setup—
including cross
drilling and
cross tapping

shockless indexing combined with independently-powered stock reel..

gives greater sustained accuracy...longer machine life



SHOCKLESS, POSITIVE INDEXING of the spindle carrier at high speed is accomplished by a Geneva mechanism. Indexing starts smoothly from a standstill, rapidly accelerates, then decelerates and comes to a dead stop without shock. Accurate location and positive locking of the carrier is assured by the locking pin mechanism.

STOCK REEL IS INDEPENDENTLY POWER INDEXED through a separate shaft and gear. This eliminates torsional strain and any tendency to whipping action, which might cause excessive wear on spindles and spindle carrier.

Acme-Gridleys are at their productive best when performing "secondary" operations during the primary setup—operations which otherwise would require additional time, machine investment, and floor space.

On an Acme-Gridley you can perform operations that require "on-the-button" indexing—such as cross-drilling and cross-tapping in successive spindle positions—with the same fourth-decimal-point-accuracy at the end of the shift as at the start.

And—your Acme-Gridley has power and stamina to spare, at the highest speeds and feeds that modern cutting tools can safely stand.

LET US TELL YOU MORE ABOUT Acme-Gridley BASIC DESIGN

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

National Acme

THE NATIONAL ACME COMPANY • 189 EAST 131ST STREET • CLEVELAND 8, OHIO

SALES OFFICES: • Newark 2, New Jersey • Chicago 6, Illinois • Detroit 27, Michigan

All it takes is a local phone call to your Disston distributor. He will give you prompt, personal service from his nearby well-stocked warehouse . . . help you avoid production slowdowns.

YOUR DISSTON DISTRIBUTOR ALSO OFFERS YOU:

Large economies. Your Disston distributor carries a wide inventory of the Disston tools you use regularly. Your purchasing, receiving and bookkeeping procedures are simplified—thus reducing your costs.

Sound advice. Your Disston distributor is a well-informed specialist, having wide experience in solving metal-cutting problems. As a center of information, he can help keep you informed of the latest developments in your field.

To learn more about the Disston line of fine tools—and how you can profit from using them in your plant—call your local Disston distributor.

Henry DISSTON DIVISION
H. K. PORTER COMPANY, INC.
1126 Tacony, Philadelphia 35, Pa.

HKP

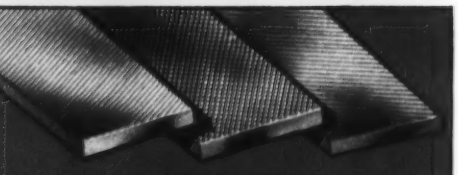
YOUR DISSTON DISTRIBUTOR STOCKS THESE QUALITY DISSTON TOOLS:

DISSTON HACK SAW BLADES

Sharp, clean-cutting blades for hand and machine use. Blades are carefully milled, accurately set. Wide selection: Super-Safe, High Speed Steel, Di-Mol, Chromel and Duraflex.

DISSTON METAL CUTTING BAND SAWS

Uniform hardness and temper, durable edges. Made in both Hard Edge Flexible Back and Hardened Throughout styles.



DISSTON FILES

Rugged, long-lasting files for every purpose. Wide selection: exclusive Bite-Rite® American Pattern files, versatile Multi-Metal files and precision-made Super-Cut® Swiss Pattern files.

CALENDAR
OF MEETINGS

Nov. 25-30, American Society of Mechanical Engineers: Annual meeting, Hotel Statler, New York. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: C. E. Davies.

Nov. 26-27, Wire Reinforcement Institute Inc.: Fall meeting, Jung hotel, New Orleans. Institute's address: National Press Bldg., Washington 4, D.C. Managing director: Frank B. Brown.

Nov. 26-30, American Society of Mechanical Engineers: 22nd National Exposition of Power & Mechanical Engineering, Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N.Y. Exposition manager: E. K. Stevens.

Nov. 26-30, National Institute of Management Inc.: Production control and inventory management program, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

Nov. 27-30, National Chemical Exposition, Public Auditorium, Cleveland. Information: American Chemical Society, Chicago Section, 86 E. Randolph St., Chicago 1, Ill.

Nov. 28-30, National Industrial Conference Board Inc.: Atomic energy conference, Waldorf-Astoria, New York. Board's address: 460 Park Ave., New York 22, N.Y. Secretary: Herbert S. Briggs.

Dec. 3-6, National Institute of Management Inc.: Program on work simplification for supervisors, Alcazar hotel, Cleveland Heights, O. Institute's address: 1008 National City Bank Bldg., Cleveland 14, O. Managing director: Nyles V. Reinfeld.

Dec. 5-7, National Association of Manufacturers: Annual meeting and exhibit, Waldorf-Astoria, New York. Association's address: 2 E. 48th St., New York 17, N.Y. Secretary: Thomas M. Brennan.

Dec. 5-7, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Electric furnace steel conference, Morrison hotel, Chicago. Institute's address: 29 W. 39th St., New York 18, N.Y. Secretary: Ernest Kirkendall.

Dec. 6-7, Illinois Institute of Technology: Cost control conference, IIT Commons Bldg., 3200 S. Wabash Ave., Chicago. Institute's address: 35 W. 33rd St., Chicago 16, Ill. Manager of public relations: Victor J. Danilov.

Dec. 9-12, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, Boston. Institute's address: 120 E. 41st St., New York 17, N.Y. Secretary: F. J. Van Antwerpen.

Dec. 10-11, Material Handling Institute Inc.: Annual meeting, Biltmore hotel, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

1957

Jan. 14-18, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: John A. C. Warner.

Jan. 18, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

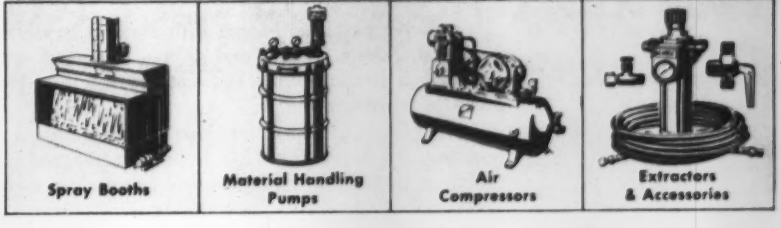
One source for
EVERYTHING
you need
for spraying any
finish or coating

Name your finishing material...
there's a Binks gun to spray it...a Binks compressor to supply the right air pressure to one gun or many.

Name your job...
there's stationary, portable or mobile equipment to fit your needs.

Name your production rate...
there's manual spraying, semi- or fully automatic equipment exactly keyed to your production requirements.

Over 60 years experience is built into Binks products...
experience in solving spray finishing problems in virtually every type of industry. This Binks bonus of professional dependability costs not one cent extra!



These are but a few of the items in Binks complete line

Over 1100 products which professionals demand when reputations and profits are at stake. For complete information on all Binks spray finishing and coating equipment or engineering and research assistance on any spray application problem...call your nearest Binks Branch Office or write direct to the address below.

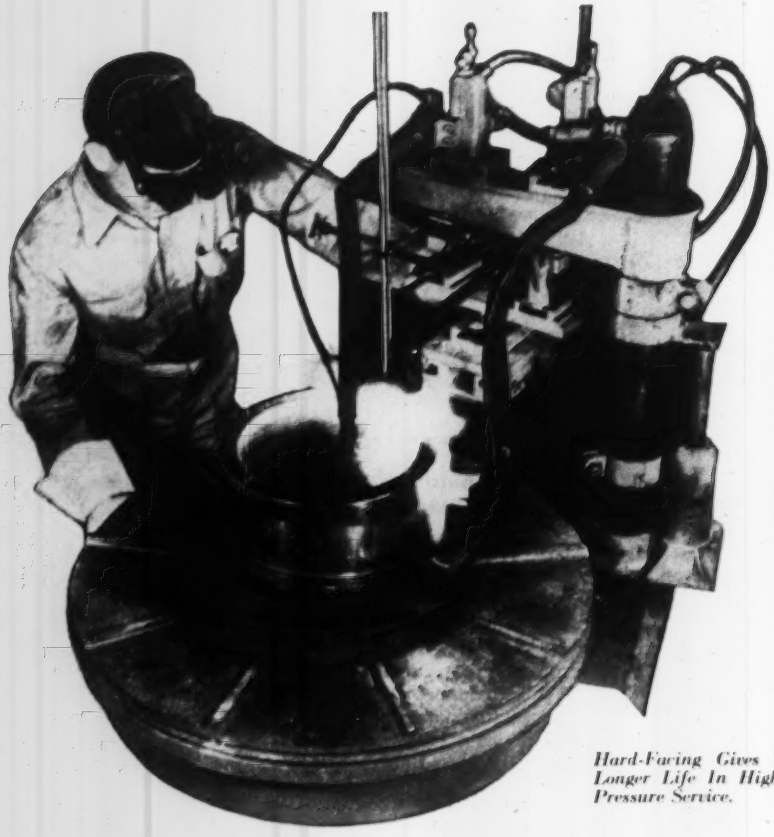
670

Ask about our spray painting school
Open to all...NO TUITION...Covers all phases

Binks
EVERYTHING FOR SPRAY PAINTING

Binks Manufacturing Co.
3122-30 Carroll Ave., West, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. AND CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY



Hard-Facing Gives This Valve Part A Longer Life In High-Temperature, High-Pressure Service.

Mechanization Speeds Production . . .

Cuts Cost of Hard-Facing by 40%

Valve parts hard-faced with HAYNES STELLITE alloy No. 6 have unusual resistance to oxidation, erosion, seizing and galling, corrosion, and abrasion. They will withstand wear even at elevated temperatures, and operate for long periods of time in high-temperature, high-pressure service.

Reclaiming worn valve parts or protecting new ones by hard-facing has always been an economical practice. Now mechanization has made it even more attractive. Mechanized hard-facing is fast . . . up to four times faster than manual methods. It produces smooth, sound deposits that require less finishing time. And because it provides closer control over the hard-facing operation, less rod and less oxygen and acetylene are consumed.

Haynes Stellite Company designs and produces mechanized equipment for depositing hard-facing rods by the oxy-acetylene process. Machines are available for surfacing flat, longitudinal surfaces; flat, angled or grooved parts; and for handling cylindrically shaped parts. Write to any district office for more information on mechanized equipment and on the 19 HAYNES hard-facing alloys.

HAYNES
TRADE-MARK
ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works: Kokomo, Indiana

Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

The terms "Haynes" and "Haynes Stellite" are registered trade-marks of Union Carbide and Carbon Corporation.

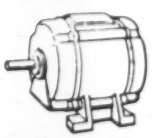
NEW Elliott C-W type N Motor PERMANENTLY SEALED Against Dust, Moisture, Corrosive Fumes

The rugged "Sealedpower" cast frame Elliott motor shown above is the modern version of the design pioneered in this country by Crocker-Wheeler. An external fan, made of sparkless material, and surrounded by a cowl, blows air along the frame for highest cooling efficiency. An internal fan provides continuous air circulation within the enclosure. All openings in the frame are tightly sealed, providing complete protection to windings and working parts.

Once applied only in locations where extremely destructive atmospheric conditions prevail, totally-enclosed motors are today rapidly gaining acceptance for all types of applications. Users find that the total over-all cost—first cost plus maintenance—is less than that of open or semi-enclosed motors.

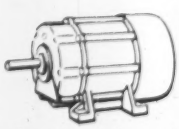
Ask your Elliott representative for details, or write for the new type N motor bulletin. Address Elliott Company, Crocker-Wheeler Division, Jeannette, Pennsylvania.

OTHER C-W TYPE N MOTOR ENCLOSURES



Totally-enclosed non-ventilated

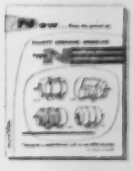
Dripproof Protected



Totally-enclosed, fan-cooled Frames 256 U and smaller

ELLIOTT Company
CROCKER-WHEELER DIVISION

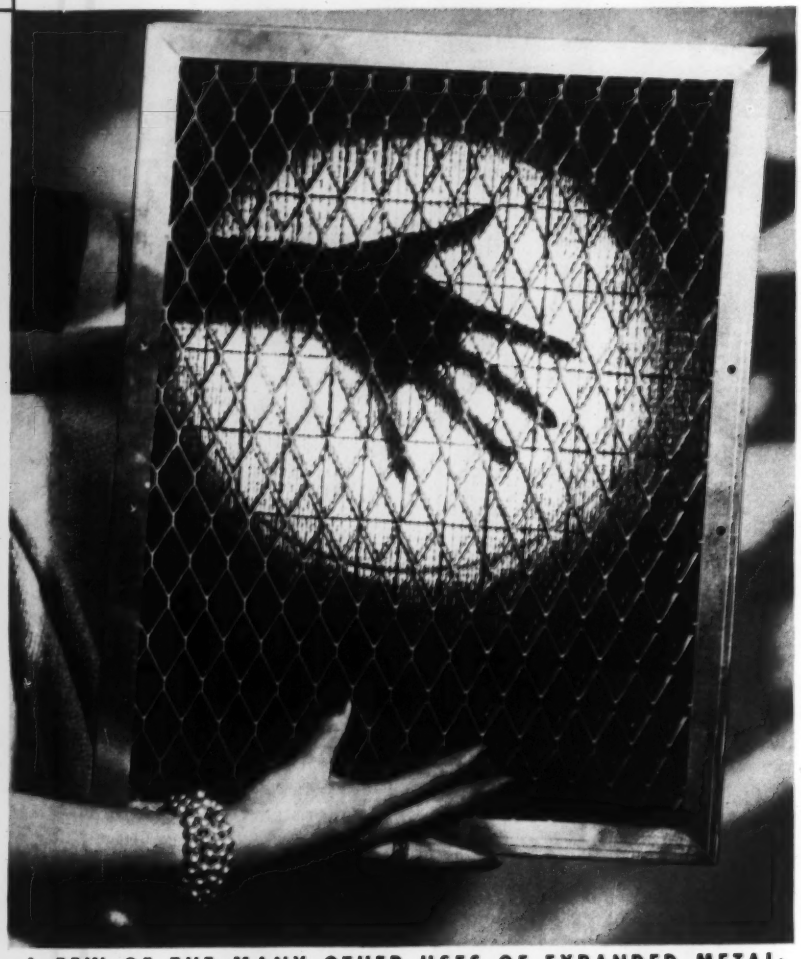
We will be glad to send a copy of this new booklet describing the complete line of Elliott C-W type N motors. Please write on company letterhead.



W6-6

Made by Hadley Products Co., Inc., Marietta, O., the Electronaire filter is used in heating and air conditioning units. Features unique, permanently electrostatic thermo-plastic monofilaments. Grilles are Penmetal expanded aluminum.

They market a permanent filter with the help of expanded aluminum



Sales appeal of an Electronaire filter is permanence . . . and washability. Never needs replacing; cleans easily in water.

The retaining grilles won't rust . . . can't ever loosen . . . yet allow free passage of air and water. That's because they are shaped from remarkably versatile Penmetal expanded aluminum.

When aluminum is slit and stretched to form expanded metal, it retains its inherent advantages —gains the added features of even lighter weight, high percentage of open area and greater strength. This combination of properties offers a tremendous potential for product design and improvement. Particularly where grilles or guards are required.

So, take advantage of Penmetal expanded aluminum in your designs and in your selling. But first, you ought to have a reference copy of bulletin 507 E-M. Write today.

PENN METAL COMPANY, INC.

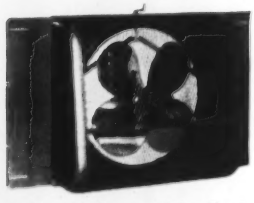
General Sales Office:
40 Central Street, Boston 9, Mass.
Plant: Parkersburg, W. Va.
District Sales Offices: Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, St. Louis, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg

METAL MARK Penmetal 1869 OF QUALITY

A FEW OF THE MANY OTHER USES OF EXPANDED METAL:

Air Conditioning Unit Grille (Berns Manufacturing Co., Chicago, Ill.)

Railroad Car Air Filter (Farr Company, Los Angeles, Calif.)



Fan Enclosure (Atlas Tool & Manufacturing Company, St. Louis, Mo.)

PM-115

Lapointe Machine Tool Company, Hudson, Massachusetts

FIRST OF ITS KIND IN THE WORLD!

. . . And It's Lubricated by Cities Service Pacemaker 400 T Oil!

LAPOINTE MACHINE TOOL COMPANY, originator of the broaching method of cutting metal over 50 years ago, has now originated the first vertical broaching machine with variable speed electro-mechanical drive.

Purpose of the huge, gear-driven machine is to increase tool life up to 500% through smoother operation, thus saving down time and producing more accurate work.

Selection of a lubricant for the new machine was of special importance because of the tremendous pressures it develops: normally 30,000 pounds, sometimes up to 60,000 pounds. Of the many brands of lubricants Lapointe tested, Cities Service Pacemaker 400 T had the necessary requirements for the job . . . so naturally, this superior lubricant got the job.

"We test the machines with Pacemaker 400 T at the factory and then put it in again when the broaches are assembled at the buyer's plant," says Lapointe. "It offers all the characteristics we need: Good film strength, high viscosity index, and exceptional anti-foam and anti-oxidant qualities. Needless to say, we're pleased and impressed with this Cities Service lubricant."

Like scores of others, Lapointe has discovered the search for a proper lubricant ends at the Cities Service label. Altogether, there are hundreds of Cities Service products for the exacting needs of industry. For more information, talk with your nearby Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Quick Facts About New Broaching Machine

USES: Now used for broaching aircraft engine turbine buckets, but can be adapted to general broaching.

ADVANTAGES: Increases tool life 400-500% through smoother operation, less down time. Produces more accurate work. Variable cutting speed: 12 to 75 FPM. Available in single or double ram models with 72" to 100" stroke.

Quick Facts About Pacemaker 400 T Oil

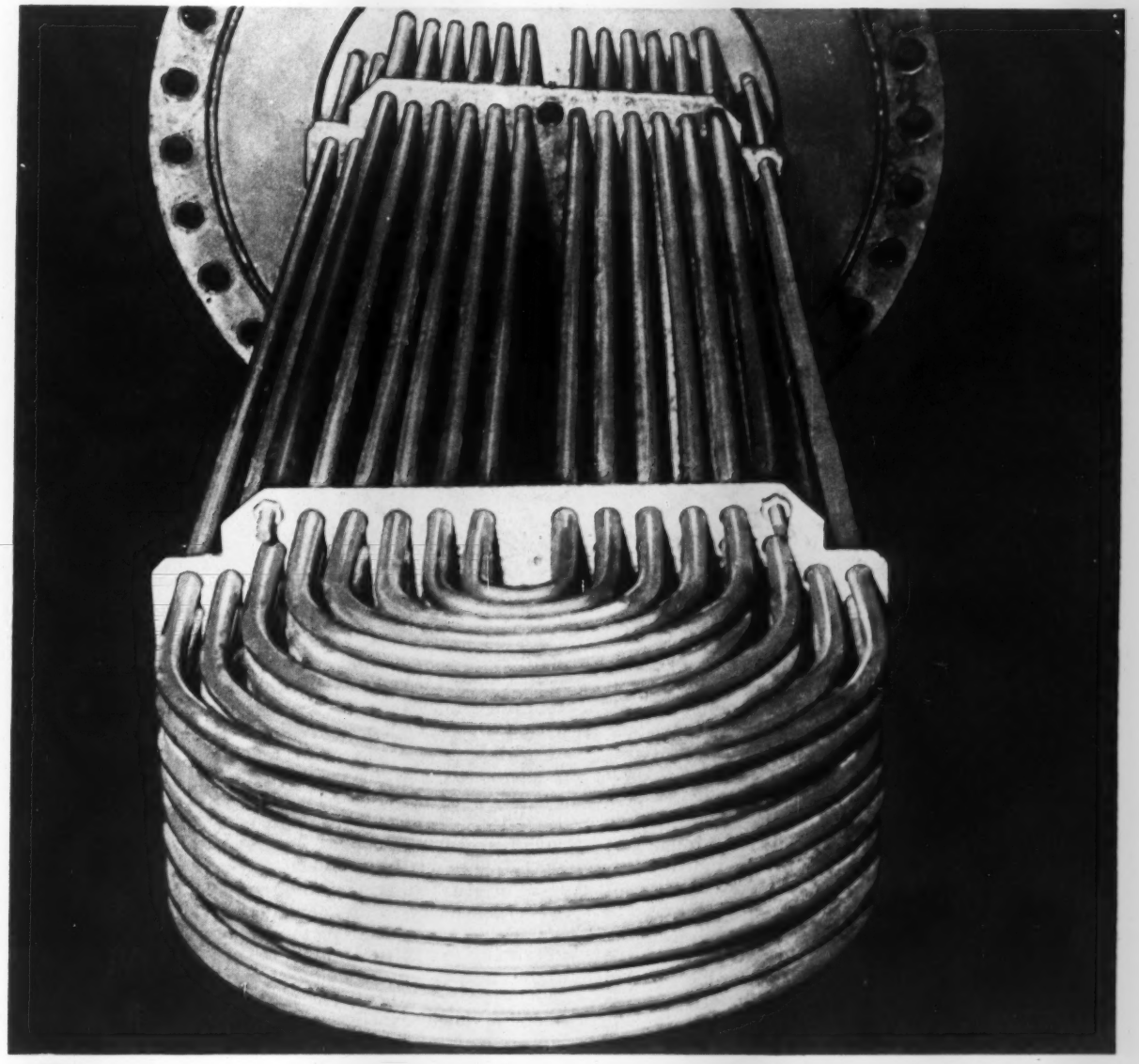
USES: Propulsion turbine units where oil is circulated under heavy pressure. Widely used in naval and commercial vessels, high speed industrial machinery.

ADVANTAGES: High viscosity index, excellent heat resistance and film strength. Chemically fortified against oxidation, rust, and foaming.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Steel-Weld
FABRICATION
Use WELDED STEEL
for Greater Strength
with Less Weight!
Gas Turbine Components are also produced in welded steel. The turbine cylinder housing for a Westinghouse Industrial Gas Turbine, shown above, and the parts and assemblies illustrated at the left, will give you a comprehensive picture of Mahon capabilities and facilities . . . assets which enable the Mahon Company to produce virtually any heavy part or assembly in welded steel at lower cost. This is particularly true in short run production programs where the manifold advantages and economies of weldments are most fully realized. If you require parts or assemblies for processing machinery, machine tools, or any other type of heavy mechanical equipment, you can call on Mahon with complete confidence. You will find in the Mahon organization a unique source for welded steel in any form . . . a source with long experience and complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill and advanced fabricating techniques are supplemented by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information, or have a Mahon sales engineer call at your convenience.
THE R. C. MAHON COMPANY • Detroit 34, Michigan
Sales-Engineering Offices in Detroit, New York and Chicago
Engineers and Fabricators of Steel in Any Form for Any Purpose
MAHON



Carpenter Stainless No. 20Cb Tubing withstands Tortuous Fabrication and Service

Note the tortuous hairpin bends in this tube bundle used in a large oil refinery to handle concentrated H_2SO_4 at temperatures from 175-194°F, and pressures from 300-400 psi. Whenever and wherever *you* design or use equipment that handles severe corrodents, check the service-proved cost-saving results you can expect with Carpenter Stainless No. 20 and No. 20Cb. Ask your Carpenter Distributor about these super stainless alloys available in tubing, pipe, sheet, plate, bars, wire, strip and billets.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

Carpenter No. 20 bars, strip, wire and billets are available also from The Carpenter Steel Company, Reading, Pa.

SIR HENRY BESSEMER *concentrated on steel metallurgy when England needed cannons for the Crimean War. Steel was then being made from wrought iron by the slow, costly crucible method. He sought to produce it faster by blowing air through molten pig iron. His first attempt, in 1854, succeeded.*

But Bessemer's process required Swedish iron and could produce only high carbon steel. With English irons, it failed completely. For years, Bessemer tried to produce mild steel. The final solution came when manganese was added in the form of spiegeleisen, opening the door to the modern age of steel

Great Names in Steel Making #III

When you look at Henry Bessemer's great achievement, two things stand out. First, his research was prompted by a critical war-time need. Second, his process was not perfected until freed from its dependence on imported iron.

Men familiar with modern rolling mill practice will note interesting points of similarity in the development of an all-American lubricant replacing palm oil.

The search for such a lubricant began during World War II, when the palm oil then indispensable for cold rolling had to be imported across submarine-infested oceans. Success came midway in the Korean War, when Ironsides engineers announced the perfecting of Palmoshield, "the palm tree that grows in Ohio."

Palmoshield ended, forever, our country's dangerous dependence on imported palm oil. Within six months of its appearance, two-thirds of our major tin plate mills were using or testing Palmoshield. In the four years since, its application has steadily broadened to the rolling of sheet, long terne and coating lines as well.

Palmoshield has every desirable characteristic of palm oil, but is compounded entirely of domestic materials. It need not be stockpiled. Fatty acid content can be controlled within ½%. Most gratifying of all, in mill after mill its use has resulted in increased production.

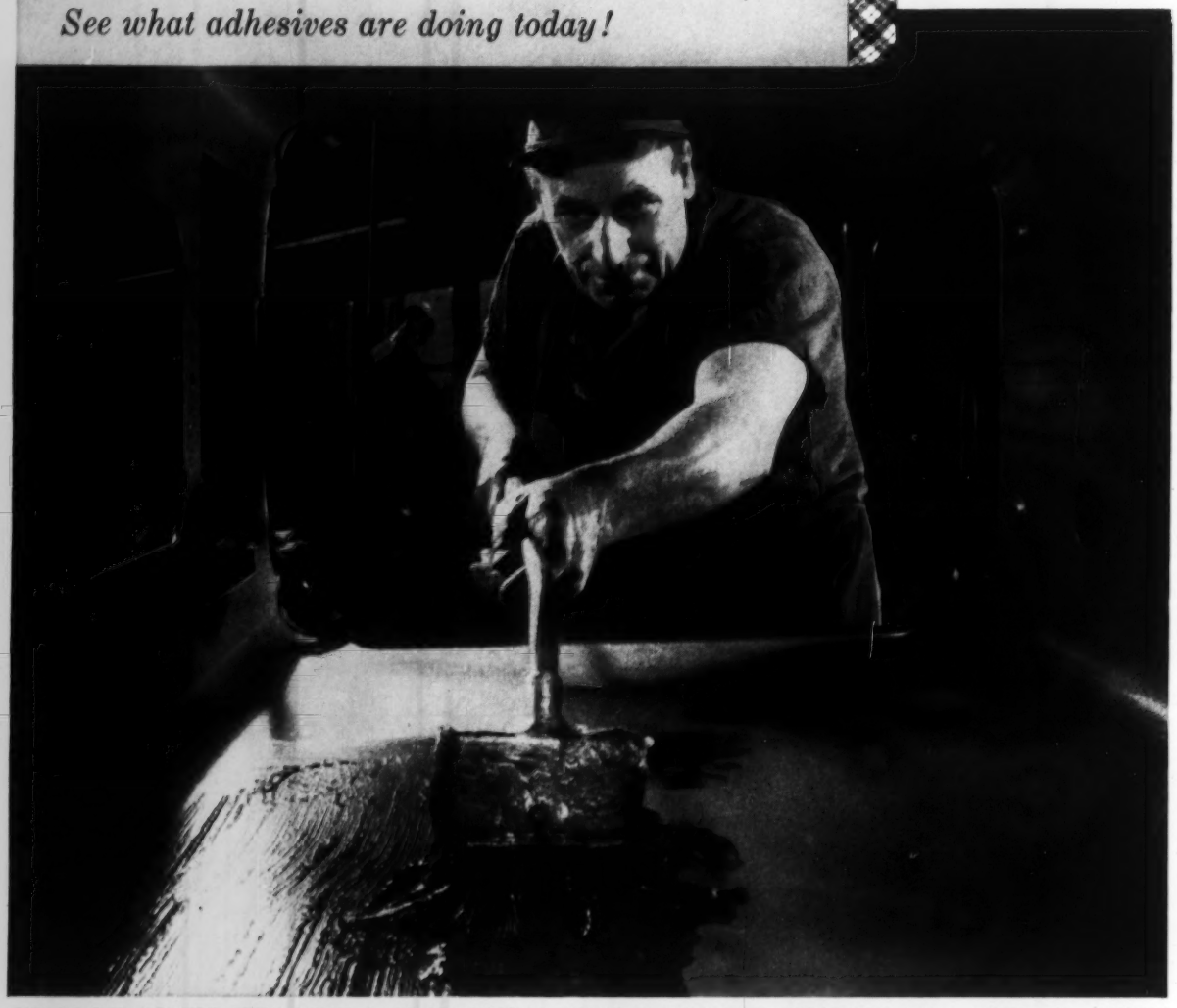
With few exceptions, major rolling mills today are either using Palmoshield, or have fully tested it in their production so as to be prepared to adopt it without changing their mill operation at any future time.

In the past four years, Ironsides engineers have successfully compounded Palmoshield for all different methods of application. They know how and stand ready to "custom tailor" Palmoshield for the particular method you employ. Their experience, and the advantages of an unfailing domestic source of supply, can both be yours through a letter or phone call addressed to The Ironsides Company, Columbus 16, Ohio.

By the makers of Palmoshield
"the palm tree that grows in Ohio"

JOSEPH MARGULIES.

See what adhesives are doing today!



OUT OF THIS WORKER'S BRUSH FLOWS A MODERN FASTENER THAT HELPS BUILD BETTER INCINERATORS. IT'S A RUGGED 3M ADHESIVE.

Setting a tougher trap for heat

It's got to be hot—up to 350°F.—inside this incinerator outer cabinet, so that even *wet* refuse will burn.

To hold the temperature, heat must be kept steadily on the job. A 3M adhesive, EC-321, does it by fastening fibrous glass insulation for keeps inside the cabinet. Trapped, the heat stays hard at work, does the job.

But EC-321 does more than just guard incinerator efficiency. It helps build them more durably, more economically, too. It eliminates the hot spots, weld marks and half the labor of former methods.

Since switching to 3M Brand adhesive, the product engineer hasn't had one complaint of adhesive failure.

Hundreds of other 3M adhesives serve industry in a thousand varied uses.

SEE WHAT ADHESIVES CAN DO FOR YOU!

To boost product quality and cut costs, consult 3M research. Contact your 3M Field Engineer. For a free booklet and more information, write: 3M, Dept. 3011, 417 Piquette Ave., Detroit 2, Michigan.

PRODUCT OF 3M RESEARCH

3M ADHESIVES

ADHESIVES AND COATINGS DIVISION, **MINNESOTA MINING AND MANUFACTURING COMPANY**

417 PIQUETTE AVE., DETROIT 2, MICH. • GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 99 PARK AVE., N. Y. 16, N. Y. • CANADA: P. O. BOX 757, LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE ADHESIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

When a Lassie meets a Massey

Coming through the Rye

Massey-Harris-Ferguson that is, neighbor, whom you'll find in the rye and the wheat and all over farms 'round the world — because M-H-F products are vital to profits in farming.

And at Massey-Harris-Ferguson resistance welding is just as vital to profits in manufacturing.

The combination of ingenious production engineering and Sciaky resistance welding techniques achieves economy usually associated with mass production . . . *but* it achieves this economy on short runs of a wide variety of parts!

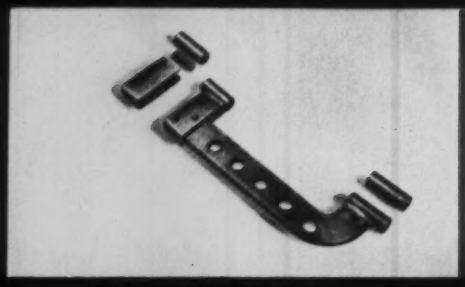
If *you* want to combine mass production economies with short production runs . . . look into Sciaky resistance welding — just like Massey-Harris-Ferguson did!

SCIAKY®

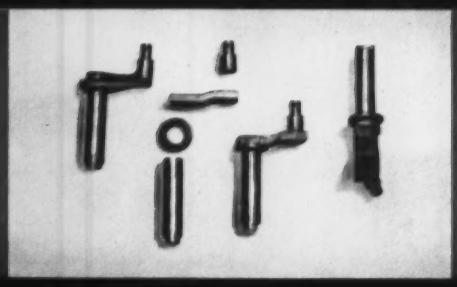
Largest Manufacturers of Resistance Welding Machines in the World

One of Massey - Harris - Ferguson's proudest achievements — the 90 Custom Special Self-propelled Combine.

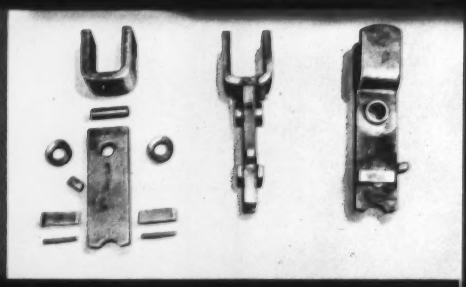
Turn the page—Take a look for yourself at just a few of the advantages . . .



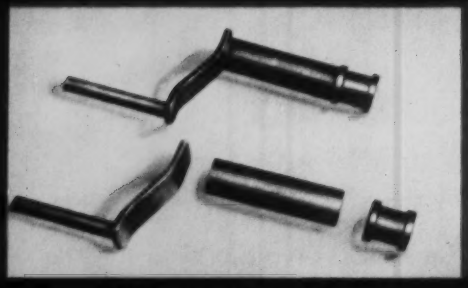
DRAW BAR AND KEEPER—Save 19¢ each over arc welding



BELL CRANK—Save 65¢ each over arc welding

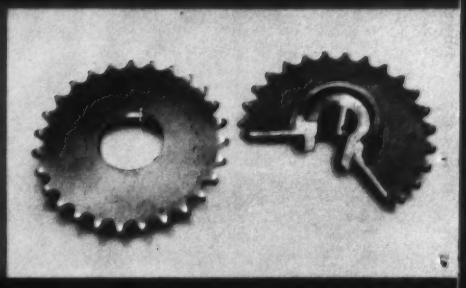


YOKE—Save 83.75¢ each over arc welding, more satisfactory product

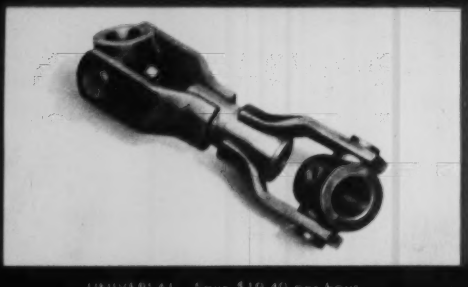


CRANK—Save $29 per hour of production over castings

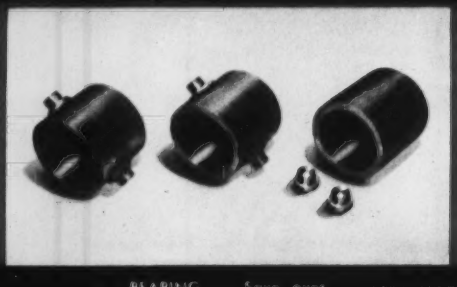
LATCH—Save 4.29¢ each over arc welding



SPROCKET—Save $17.60 per hour of production over arc welding



UNIVERSAL—Save $19.40 per hour of production over arc welding



BEARING—Save over $1.00 each over casting

BELT TIGHTENER—Save $1.24 each over brazing

Mass Production Methods with Sciaky Techniques save up to 60% on short run fabrication

Impressive cost reductions are only part of the Massey-Harris-Ferguson story — versatility, speed, and quality combine to result in an unusual success with a wide variety of short run applications.

Over 200 assemblies, formerly fusion welded, cast, or forged, are now made from standard, off-the-shelf stock and screw machine products. Average set-up time for resistance welding is only *30 minutes*. Fixturing costs have been reduced to less than $75.00. The field performance has been excellent!

Three standard Sciaky Three-Phase balanced load welders are used by M-H-F. Control set-ups for any job are quickly made from performance data charts. Production time is never wasted in try-out to prove weld quality.

"Resistance Welding At Work", Vol. 5, No. 1, tells the whole M-H-F story. Write for your free copy of this dramatic proof of Sciaky Basic design thinking — resistance welding techniques to put the profits back into manufacturing.

For specification welding such as required for air frame, jet engine and ordnance manufacture ask about the new Sciaky Predetermined Electronic Counter Weld Control.

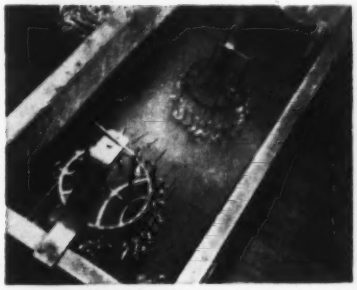
One of three standard Sciaky welders in use at M-H-F showing the fixturing for producing a yoke.

Largest Manufacturers of Electric Resistance Welding Machines in the World

SCIAKY.

Sciaky Bros., Inc., 4924 W. 67th Street, Chicago 38, Illinois, POrtsmouth 7-5600

Vapor degreasers – manual or conveyor – show better production with TRICLENE® D



"Brighter cleaning... 50-75% longer between cleanouts"... *American Hardware*

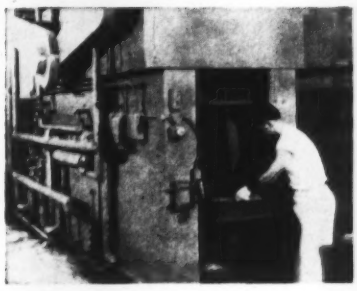
The P. & F. Corbin and Russell & Erwin Divisions of the American Hardware Corp., New Britain, Conn., are well-known for their complete line of builders' hardware which includes locks and door fittings with highly polished surfaces of brass, bronze, copper, steel and zinc.

Since these two divisions began using "Triclene" D trichlorethylene exclusively in six conveyorized and three manual degreasers, they report: "Brighter cleaning . . . no necessity to wipe parts before lacquering." They also noted a steadier pH and that operations went 50 to 75% longer between cleanouts and that the coils were easier to clean.

"Far fewer rejects from etching and staining on aluminum"... *Hecker Manufacturing Co.*

One of the big problems this San Francisco firm had to contend with was etching and staining on the highly polished surfaces of their aluminum shower and tub enclosures when the solvent formerly used developed a high acid content. This too frequent occurrence resulted in excessive loss of production from rejects and downtime.

"Since changing to 'Triclene' D," reports Mr. Cary, Plant Superintendent, "we've noticed a big reduction in the number of rejects, and solvent control is no problem at all. This adds up to real savings in maintenance and production costs."



"We have less downtime and consistently high production"... *Standard-Thomson Co.*

When you make accessories for the aircraft, automotive and window-hardware industries, as does Standard-Thomson in Dayton, Ohio, your production lines must match theirs in speed and efficiency. Substandard work and downtime can be very costly indeed. And every operation *eliminated* speeds up production.

Here's what they report: "We haven't any concern about solvent condition since we started using 'Triclene' D. We've noticed a big reduction in the number of rejects due to etching, too. Moreover, we've eliminated bright dipping of brass parts and the time between degreaser cleanouts has been increased from two to six weeks."

Effects of heat, light, air, acids and aluminum chloride are resisted by "Triclene" D with its locked-in stabilizers. That's why it is so widely used for quick, efficient degreasing of all types of metals in so many industries.

Get all the facts on "Triclene" D. Send for this 42-page fact-packed illustrated book which gives you information on all phases and types of vapor degreasing operations. For your free copy, send coupon below.

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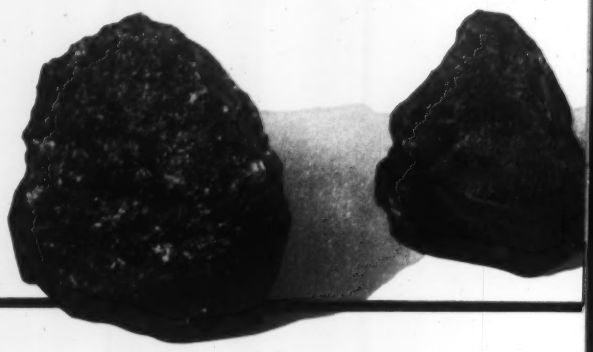
ANNOUNCING . . . the NEW

44 ALUNDUM* abrasive

. . . a revolutionary Norton development for new "TOUCH of GOLD" economy in alloy steel conditioning

You Can SEE The Difference! The new Norton 44 ALUNDUM abrasive (at right) differs definitely in appearance from ordinary aluminum oxide abrasive. The finer grain structure of "44" indicates its much denser, tougher composition. And the money-saving performance of this modern new abrasive is just as easy to spot — every time 44 ALUNDUM wheels go to work for you.



In new 44 ALUNDUM abrasive Norton brings you a combination of grinding quality, versatility and economy never before equalled in a non-premium abrasive.

We want to emphasize that point. Although the new "44" is non-premium priced, right there its resemblance to any ordinary aluminum oxide abrasive ends abruptly. It is definitely different and better in every way.

"44" is made differently, by a special Norton-developed electric furnace process that results in extreme toughness and ruggedness.

"44" performs differently. Compared to ordinary aluminum oxide abrasive wheels, the new 44 ALUNDUM wheels cut faster and last longer. They finish better and do more work per wheel. In your conditioning operations on alloy steel these "Touch of Gold" advantages mean improved product quality, higher production rate and lower grinding costs.

"44" is job-proved. Over 1100 different tests were made on the new 44 ALUNDUM wheels, in plants of all kinds throughout the country. Here are some typical steel mill reports:

"Faster cutting, better finish, much less burn."

"Excellent on 431 stainless steel, giving exceptional cut without appreciable breakdown."

Adding Up

"44" is a real work-horse abrasive that delivers thoroughbred performance. On any job for which you're now using ordinary aluminum oxide wheels, the new 44 ALUNDUM abrasive with BZZ bond will give you better results. Your operators will like these wheels' faster, freer cutting action that means easier handling — and their extra toughness that means greater safety. And *you'll* like the way they cut grinding costs measured by any standards — in terms of tons ground, or pounds of metal removed per wheel, or man-hours per ton ground.

Your Norton Abrasive Engineer will be glad to prove this to you. See him about arranging test runs of the new 44 ALUNDUM wheels in your mill. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

THE NEW PROFIT FACTOR IN ALLOY STEEL CONDITIONING. To your grinding of alloy steel billets, slabs, sheet bars and strips, new 44 ALUNDUM wheels add the latest Norton-engineered, profit-boosting "Touch of Gold." Made with the famous BZZ resinoid bond, they'll take the heaviest pressures — with fast cutting action and extra long wheel life never before matched in non-premium priced wheel performance.

W-1740

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to make your products better

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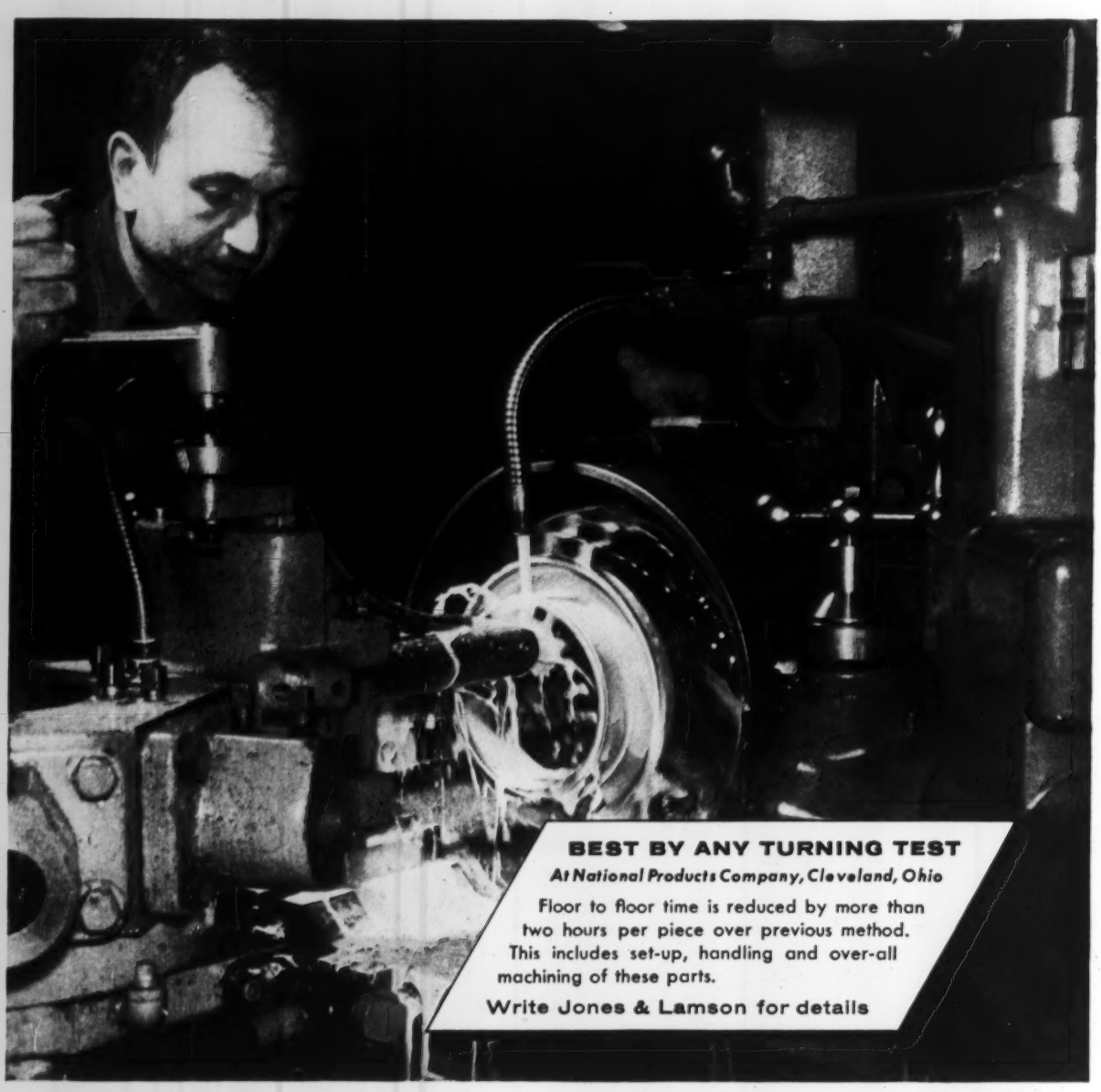
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At National Products Company, Cleveland, Ohio
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MORE PIECES per hour
MORE PROFIT per job
than any other turret lathe of comparable size!

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JONES & LAMSON MACHINE COMPANY, 517 Clinton St., Springfield, Vt., U.S.A.

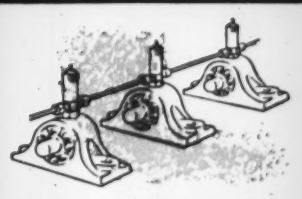
How to cut costs with

ALEMITE Accumatic®

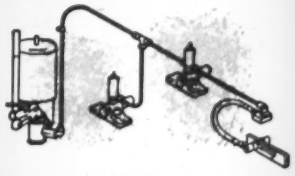
CENTRALIZED AUTOMATIC LUBRICATION

Can be built into any machine, in 4 easy steps

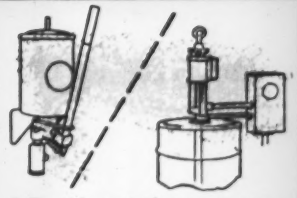
1. Replace grease cups or grease fittings with Accumatic fittings. (Available in same thread sizes as grease fittings, cups.)



2. Connect Accumatic fittings with copper tubing. (Alemite has tubing, clips and accessories for fast, neat installation.)



3. Connect sliding, rotary or oscillating parts into tubing system. (Flexible hose and swivels available for moving parts.)



4. Provide central pump to supply lubricant to system. (May be ordinary hand pump or fully automatic barrel pump.)

Type 1 Accumatic Valves

For fluid oil or light grease. In range of sizes, delivering from .005 to .100 cu. in. of lubricant. Various shapes: Tees, straight-thru, inserts, angles. Spring pressure provides gradual feed. Adjustable or fixed output. System serves up to 400 bearings. Manual or automatic operation available.

Factory-tested—field-proved!

Exhaustive in-the-field tests show no appreciable variation in the amount of lubricant discharged after 73,312 lubrication cycles—equal to 122 *years of twice-a-day service!*

Offers All These Advantages!

- Prevents application of wrong lubricant.
- Seals completely against dirt, grit, water.
- No parts are neglected—lubricates inaccessible and dangerous bearings.
- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers *exact* amount of lubricant to bearing.

ALEMITE

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Speed for
aluminum extrusion . . .

Westinghouse

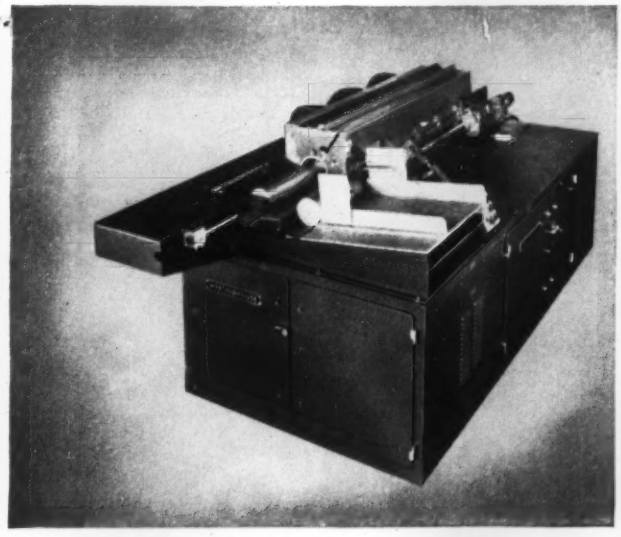
1. Greater efficiency in aluminum billet extrusion results from the speed and adaptability of Westinghouse induction heating.

C. P. Bernhardt
Engineering Manager,
Induction Heating Dept.

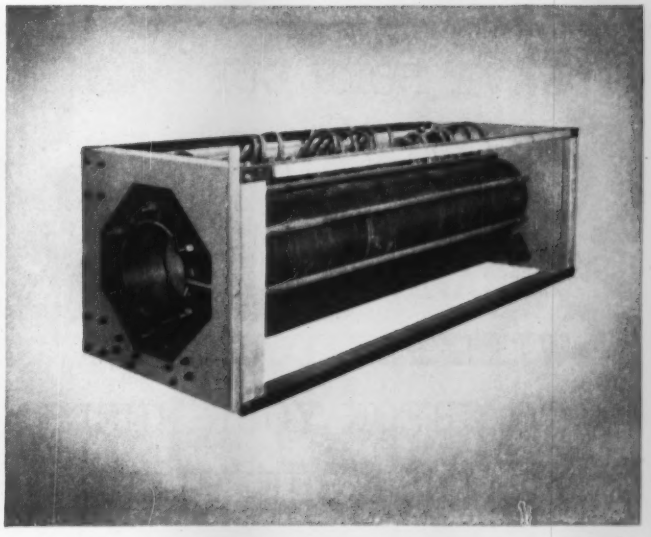
EXAMPLE: "Five thousand pounds an hour of 6-inch aluminum billets", reports Carl Bernhardt, "are heated to 1,000°F for heavy extrusion press operation." In supplying induction heating for this customer, Westinghouse saved 37% of the floor space needed for conventional furnace operation. Most important, high operating efficiency results from these five advantages in speed and flexibility:

- Short, 3-minute, start-up time. Stand-by heat losses are low.

induction heats billets on the run



2. Heating 6- or 8-inch billets to 1,000°F, this Westinghouse induction unit delivers up to 5,000 lbs of billets an hour.



3. Westinghouse coil design and engineering assures uniform heating from billet core to surface.

- Up to 80% cut in maintenance time and costs.
- Longer die life due to uniform billet heating . . . accurate, repetitive temperature control.
- Cooler, more productive working conditions.
- Pushbutton, automatic cycling of billet heating and handling directly to the extrusion press pickup.

For problem solving, call on Westinghouse technical leadership in induction heating research, design and engineering. You can be sure of complete service, too, through installation field engineering and follow-up. See your local Westinghouse industrial heating sales engineer or write, Westinghouse Electric Corporation, Induction Heating Dept., 2519 Wilkens Ave., Baltimore 3, Md. J-10450

The Westinghouse Heat-Treating Family

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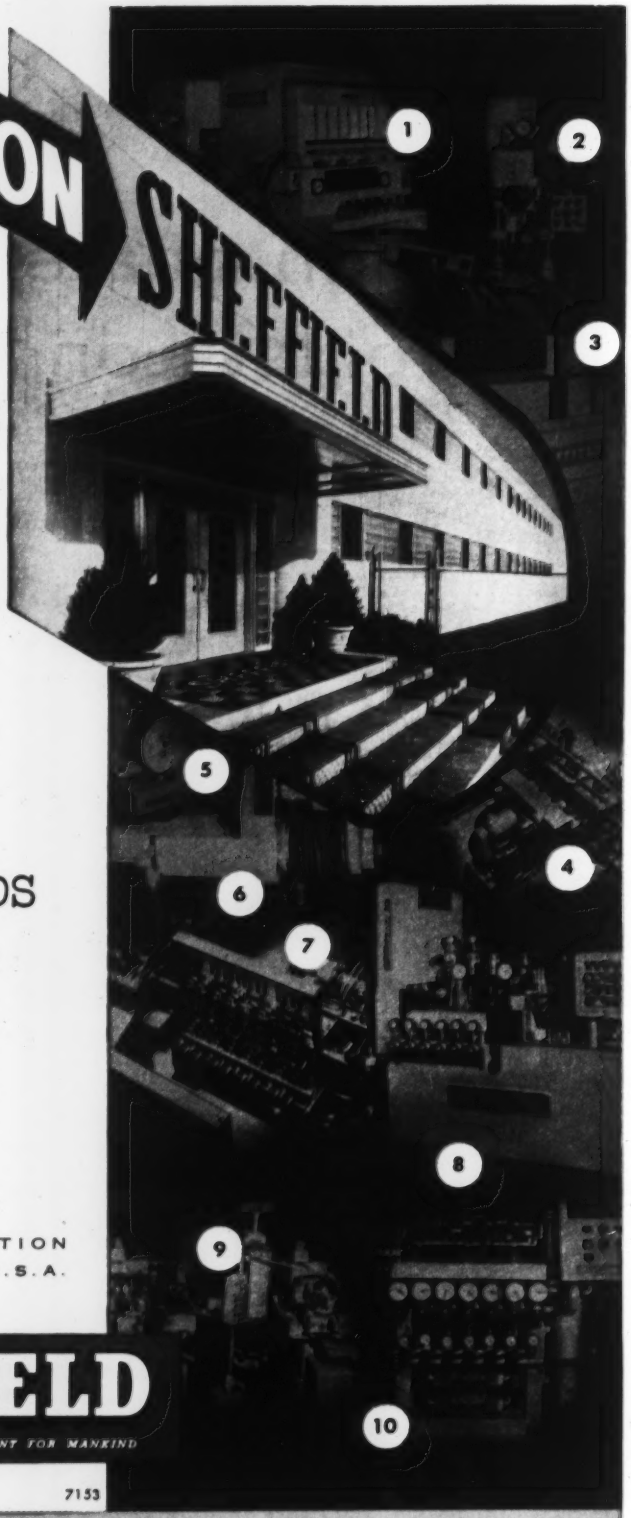

WRITE DIV. 17 FOR BULLETIN NO. AU-1154

THE SHEFFIELD CORPORATION
DAYTON 1, OHIO, U.S.A.

GOLDEN ANNIVERSARY

SHEFFIELD

MANUFACTURING AND MEASUREMENT FOR MANKIND

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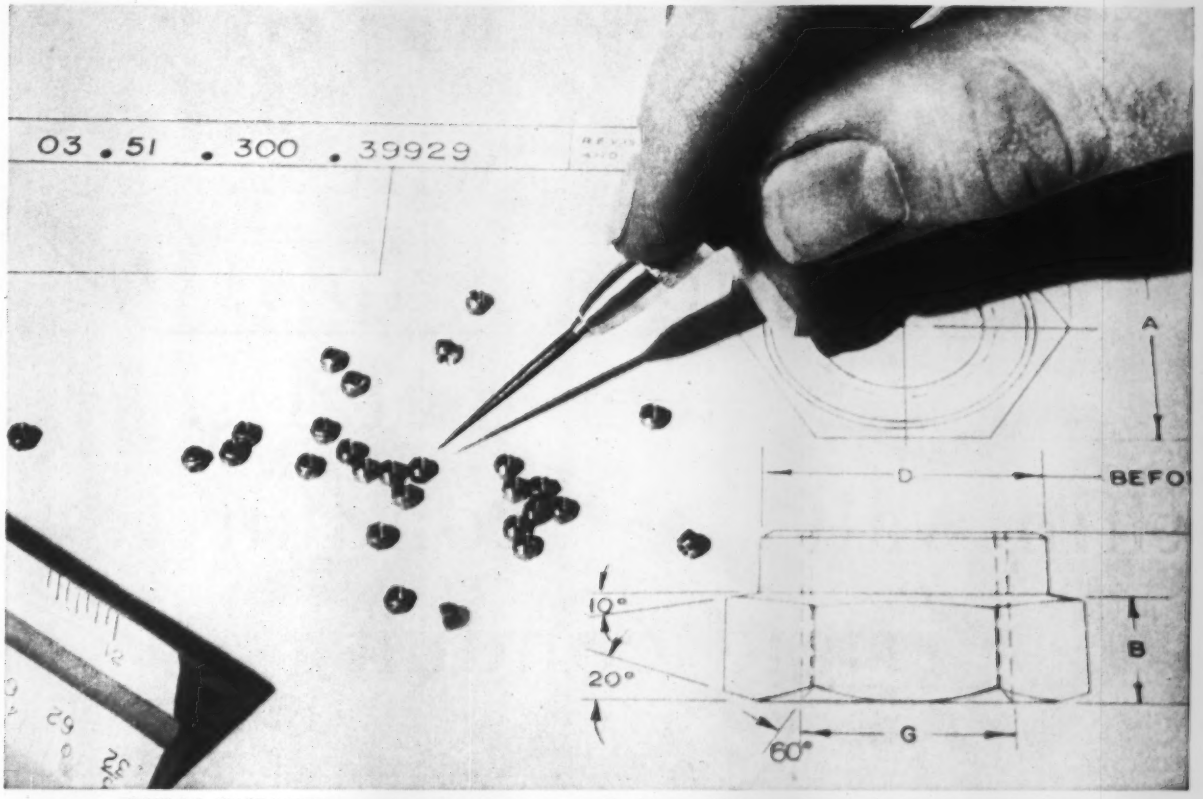
1. Gaging cylinder bores for selective assembly
2. Controlled honing of gear blank bores
3. Automatic gage for 100% inspection of small arms ammunition
4. Connecting rod inspection
5. Controlling the grinding of ball bearing races
6. Post-process size control of bearing races
7. In-line inspection of automobile part
8. Controlling 12 grinding machines
9. Controlling bore size of piston blanks
10. Automatic gaging of crankshaft main bearings



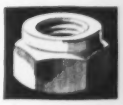
FLEXLOC MICROSIZE locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

New FLEXLOC Microsize Locknuts

Now available in Alloy Steel, Stainless Steel, Brass and Aluminum for lighter, more compact designs

SIZE	Across Flats		Shoulder Height		Across Corners	Height +.000 −.003
	MAX.	MIN.	MAX.	MIN.	MIN.	
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

SPECIFICATIONS: Available in brass (plain or cadmium plated) and aluminum (plain or chemically treated), for temperatures to 250°F; alloy steel, 18-8 stainless, for temperatures to 550°F.



New FLEXLOC Microsize locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

Microsize FLEXLOCS have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no nonmetallic inserts to pop out or deteriorate. Moisture, dryness, oil won't affect these Microsize FLEXLOCS. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on Microsize FLEXLOCS, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

STANDARD PRESSED STEEL CO.

FLEXLOC LOCKNUT DIVISION SPS

JENKINTOWN PENNSYLVANIA

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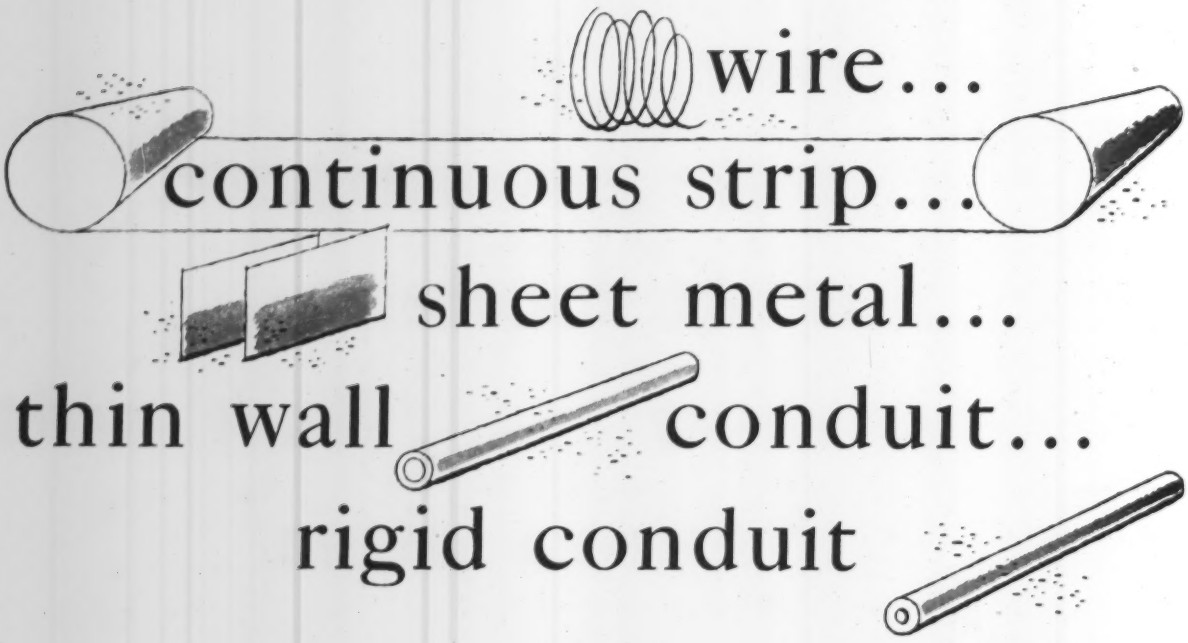

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- scrubbing
- plating
- paint prep
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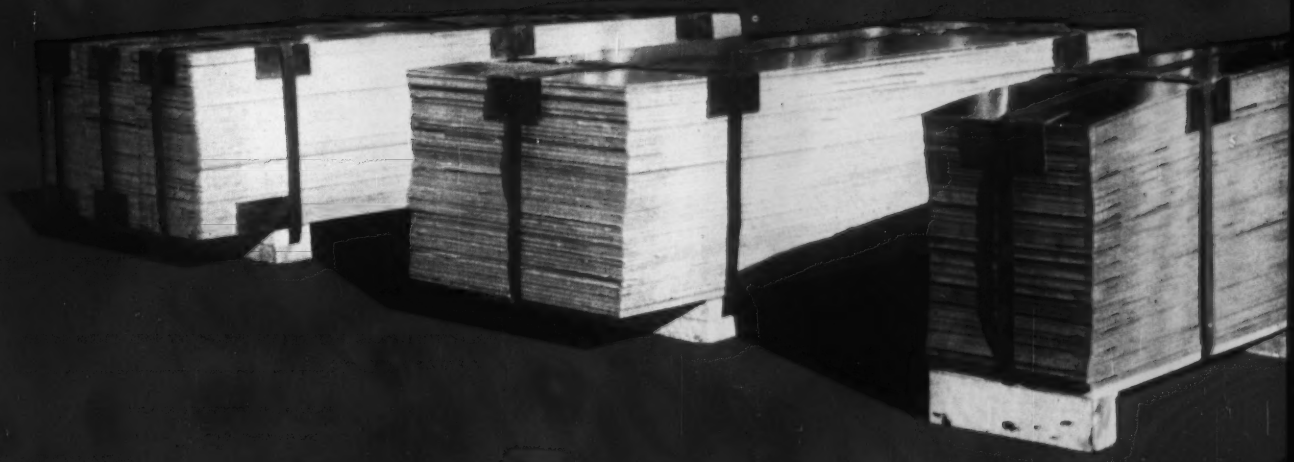

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BORG-WARNER CORPORATION, NEW CASTLE, INDIANA

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METALS DO MORE ALL THE TIME

Important facts about a new and plentiful family of low-nickel Stainless Steels!

Now in plentiful supply, the new "200" Series Stainless Steels permit steelmakers to greatly expand their output of Chrome-Nickel stainless from existing nickel supplies. With the addition of manganese, the nickel content can be cut in half to provide practical, workable stainless steels that can be applied to a wide variety of uses.

The "200" Series is meeting the constantly expanding needs of the transportation, building, manufacturing and many other fields. It's becoming increasingly popular for use in kitchen utensils, appliances, truck bodies, trains, automobile trim, hospital equipment and scores of other consumer products.

For further information, see your stainless steel supplier, or write ELECTROMET—leading producer of chromium, manganese, and more than 100 alloys for the steel and other metal industries.

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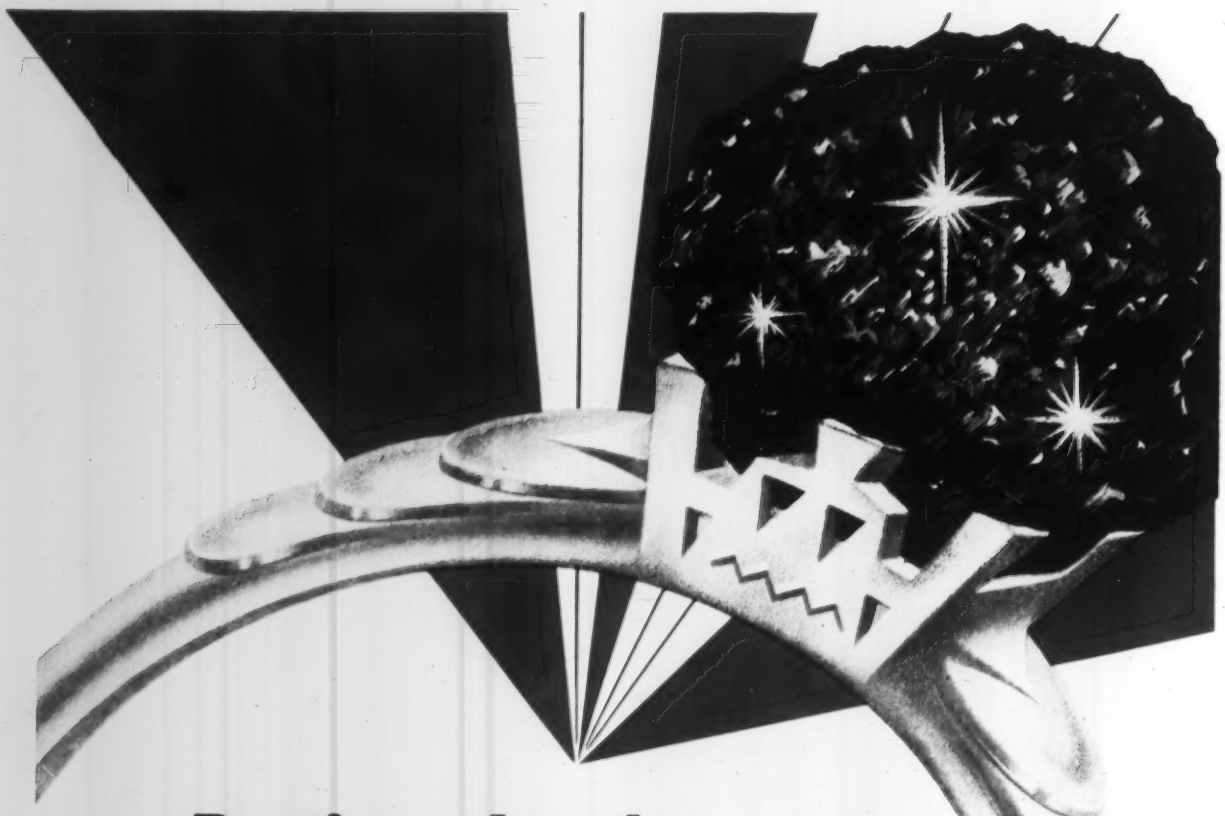
. . . THANKS TO ALLOYS



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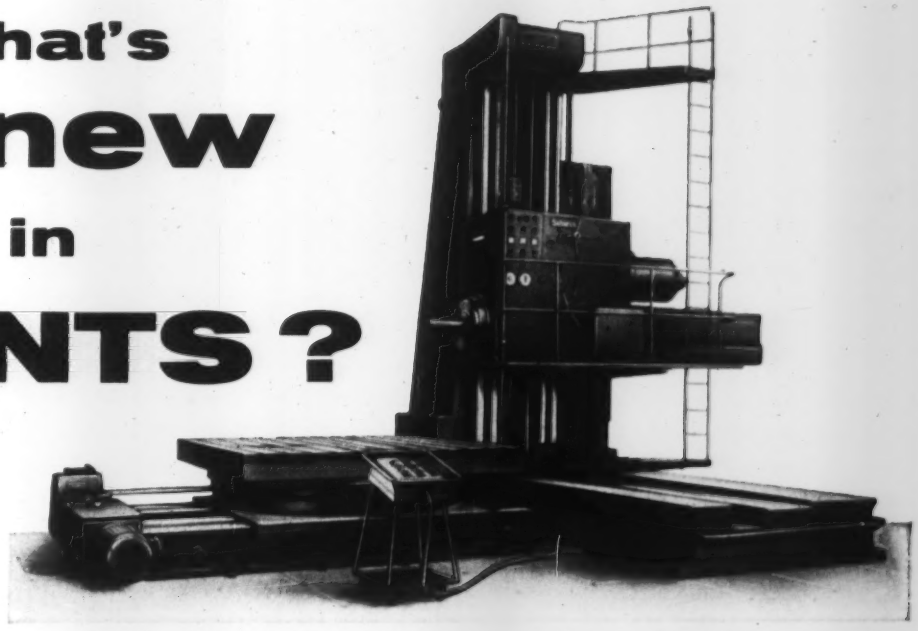
what's new in GIANTS?



This 8¾" SCHIESS model BF horizontal boring and milling machine . . . Now completely redesigned with many innovations. Here are a few . . .

Two individual drives—gear-drive for roughing, belt-drive for finishing. Belt-drive particularly suited to high-speed machining with carbide tools. New tool clamping device—does away with draw keys, hammers, drifts and binding screws. All spindle-slide movements controlled from easily accessible operating platform (or from pendant station or portable control panel, if desired). Special main-drive belt requires no readjusting. Column, spindle-slide and boring spindle may be adjusted at rapid traverse.

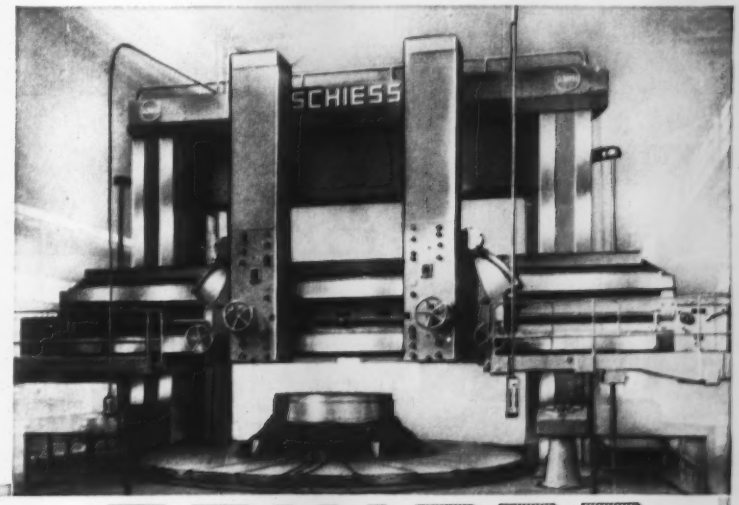
Spindle diameters, $6^{5}/_{16}$" to $8^{7}/_{8}$". Maximum diameter bored, 59"—faced, 79".

It takes Europe's largest builder of heavy machine tools, Schiess, to turn out giants like these. Parts and service as close as Pittsburgh. And an American Schiess engineer will be happy to help you size up these heavy producers for your heavy production needs. Write for catalogs and complete specifications on all Schiess BF and K models.

This 23 ft. SCHIESS model K vertical boring mill . . .

Look at all these new features—each one a time-saver! Rapid traverse motions with pushbutton control of changeover from feed motion to independent power traverse. Electro-mechanical locking of cross-rail to columns. Fingertip speed control—counter-balanced cross-rail and side-head—completely enclosed swiveling octagon rams—pendant control—automatic lubrication.

Turning diameters in standard sizes range from 8 ft. to 23 ft. (which can handle stock up to 100 tons!). Basic Schiess designs permit extra heavy machines, normally considered specials, to be built to your work diameter and load requirements. Even a diameter of 84 ft.!

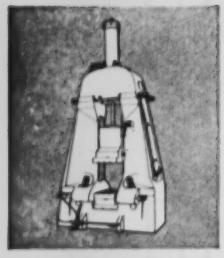


engineering division

SCHIESS

AMERICAN SCHIESS CORPORATION

1232 Penn Avenue, Pittsburgh 22, Pa.



CHAMBERSBURG CECO-DROP

- Piston-lift • Gravity drop
- Costs less to operate
- Forges more minutes per hour
- Forgings made faster
- Operation is easier and safer
- Maintenance is cheaper
- Full stroke or short stroke without interruption
- Over 400 in service in over 100 forge shops

Ceco-Drop and Trimmer

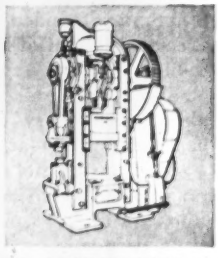
• • *for top production*

When the chips are down, it is continuous, trouble-free, quality production that puts you ahead of competition. That fact explains why the Ceco-Drop (in combination with the "indestructible" Chambersburg Trimmer) has become in nine short years, the standard gravity drop hammer of the forging industry.

Write for descriptive Bulletins

CHAMBERSBURG ENGINEERING COMPANY
CHAMBERSBURG PENNSYLVANIA

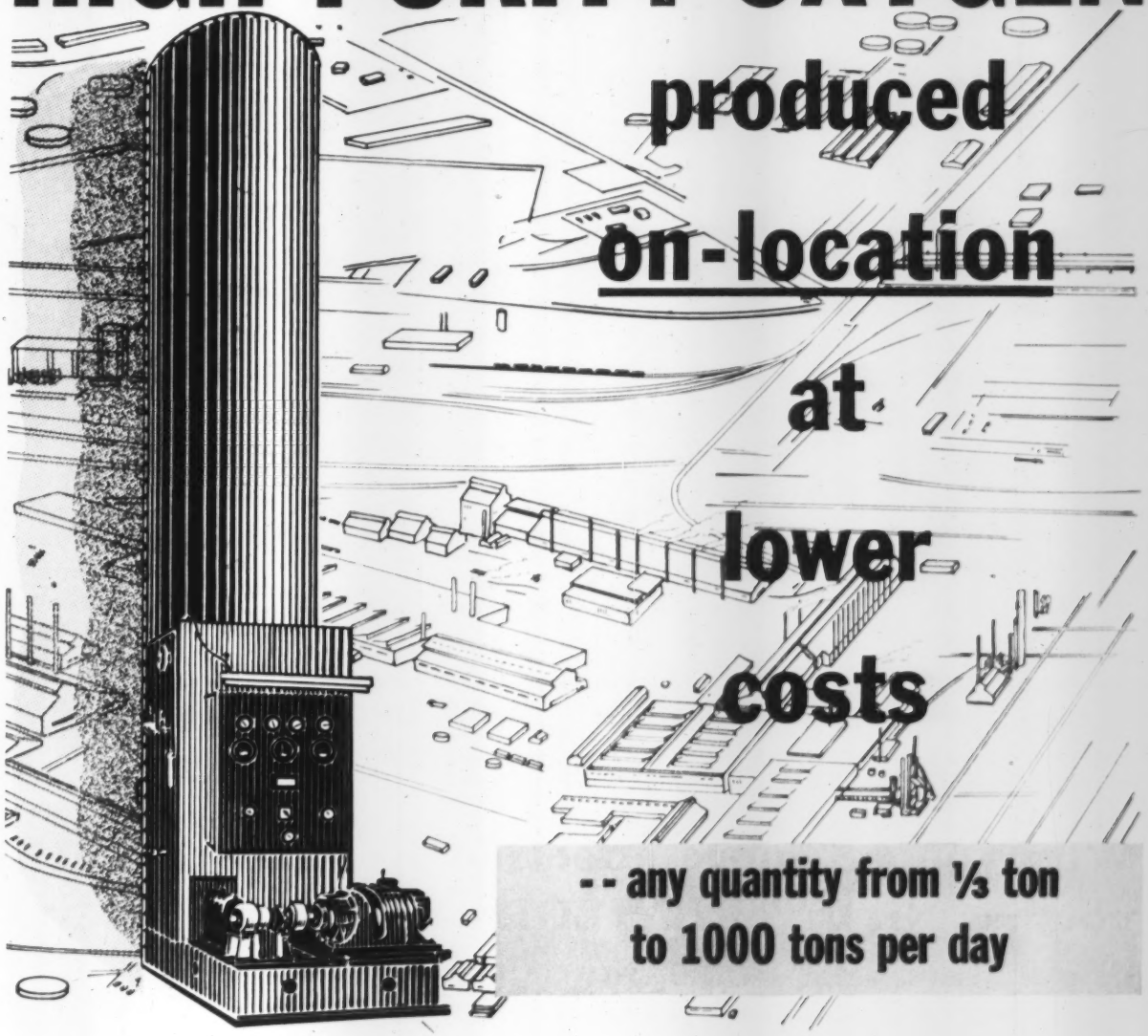
ALSO BUILDERS OF THE IMPACTER



CHAMBERSBURG FORGED STEEL SIDE TRIMMING PRESS

- Exceptional strength
- Jam-proof. Functions perfectly after stall-test
- Uses minimum floor space
- Accessible front and back
- Friction-slip Flywheel
- Interlocking forged steel side construction
- Low power consumption
- Safe
- Single or Double Crank

HIGH PURITY OXYGEN



produced on-location at lower costs

-- any quantity from ⅓ ton to 1000 tons per day

Many steel mills, foundries and other industries have found that high purity (99.5+%) oxygen can be produced on-location with substantial savings. Air Products has pioneered this modern trend toward in-plant oxygen generation by providing technology, experience and service unequalled in the industry.

More than 800 successful gas separation plants have been built by Air Products to meet widely varying needs in industry and in the military. Most of these have been oxygen and/or nitrogen generators. Many have been high purity units. The performance of these generators has demonstrated conclusively that oxygen can be produced on-location at much lower cost than "hauled-in" gases.

Air Products is prepared to build and install a complete oxygen producing facility with no capital investment on your part—on a lease basis including purchase option.

Let us furnish further data on this low-cost, reliable method of providing your oxygen requirements.

Specialists in Air Separation Equipment

LOW-COST OXYGEN...NITROGEN

Air Products
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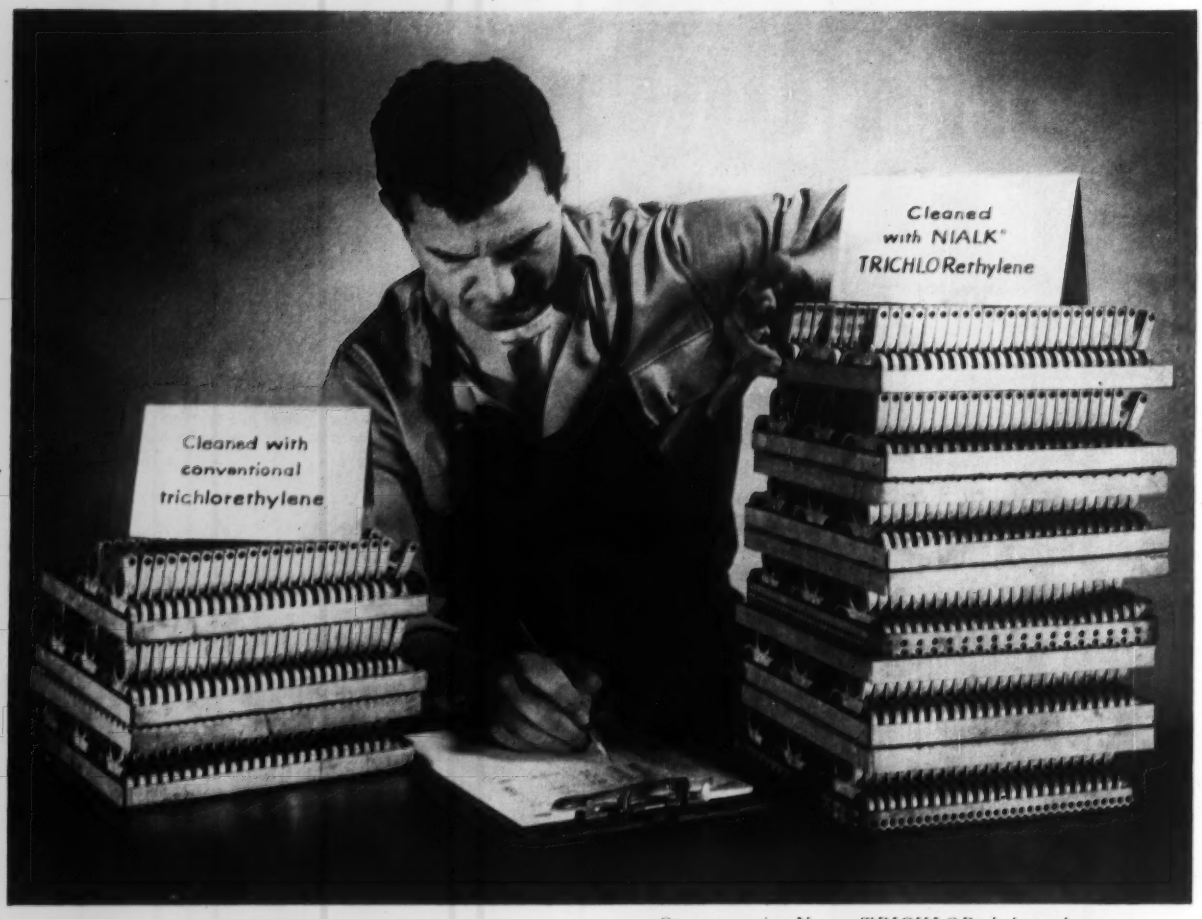
Dept. N, Box 538, Allentown, Pa.

AP



Operator using NIALK *TRICHLORethylene cleans more parts, because* NIALK *has* **psp** *which prevents acid contamination, reduces number of cleanouts.*

Why you get more effective degreasing when you use Nialk® TRICHLORethylene with psp

There's a difference—a big, cost-cutting difference—between NIALK TRICHLORethylene and conventional vapor-degreasing solvents.

Light, heat, air, acids, and active metals such as aluminum, given time, can break down improperly stabilized trichlorethylene, making it unfit for further degreasing.

Only Nialk TRICHLORethylene has psp

The stabilizer in NIALK TRICHLORethylene has **psp**—permanent STAYING power. It's neutral, non-alkaline. You *never* have to replenish it.

Only NIALK has this *permanent staying power*. Even after repeated distillations, its unique stabilizer prevents acid formation and other causes of breakdown. NIALK works equally well with *all* metals.

psp means cheaper degreasing . . . here's why

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser—cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer degreasing

See for yourself how NIALK TRICHLORethylene with **psp** stays stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a revealing resumé of comparative metallurgical tests on the five leading brands.

HOOKER CHEMICALS PLASTICS

HOOKER ELECTROCHEMICAL COMPANY

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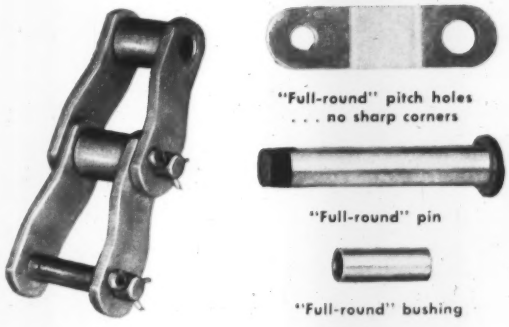
NIAGARA FALLS • TACOMA • MONTAGUE, MICH. • NEW YORK • CHICAGO • LOS ANGELES

Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER

"Stress raisers" eliminated by Link-Belt LXS chain design

LXS "FULL-ROUND" DESIGN



"FULL-ROUND" DESIGN eliminates stress concentration points. Heat treatment of all parts adds even greater strength and extra wear life to selected steels. Accurate control of these processes avoids brittleness, poor wear values and low tensile strengths . . . and assures uniformity.

Large pins, bushings mean ample live bearing area for long life

For long life under severe conveyor and drive conditions, Link-Belt LXS chain provides extra strength, increased wear resistance and wider application flexibility. This fabricated steel roller chain incorporates many advanced design and manufacturing refinements, resulting in superior ruggedness and accuracy.

Eliminate weak points

"Full-round" design does away with stress concentration points most frequently subject to failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly, increasing chain life.

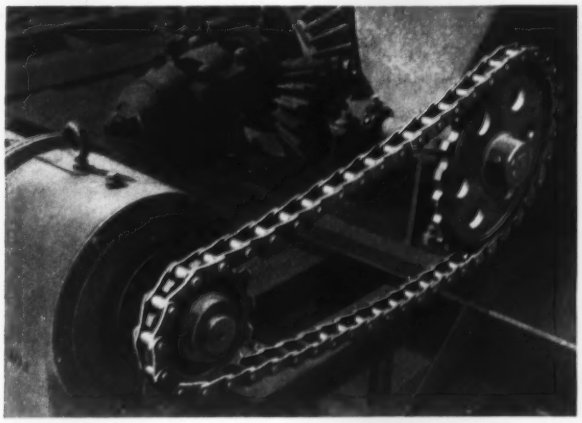
Pins and bushings are accurately sized for controlled press fit, preventing rotation in sidebars. Made from selected bar steel, sidebars are carefully machined for proper pitch hole size and for maintaining firm, tight press fit of pins and bushings. This assures close control of pitch and proper chain length after assembly.

Hardening extends life

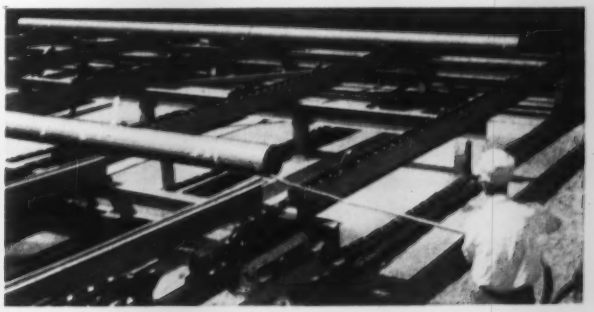
Another Link-Belt long-life extra is the controlled hardening of selected steels used in the manufacture of LXS chain. Pins, for example, are made from a tough steel, specially treated for high strength in shear and for maximum wear value. Bushings are properly hardened to shrug off shock and resist wear.

Rollers are accurately machined to assure proper operating clearances and free-rolling action. Controlled hardening gives them the necessary resiliency and durability.

LXS especially popular for exposed drives, high impacts



Link-Belt LXS chain is the long-life answer for exposed drives, abrasive and high-impact conditions. Its large, live bearing area reduces cutting action of abrasives because load is spread over a broad area.



LXS chain provides extra strength, wear-life for heavy-duty conveying

Link-Belt LXS chain has real stamina—as shown in this conveyor application for handling 1000-pound, 40-foot lengths of steel pipe. Thanks to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life for the extra-long conveyors so popular in today's move to mechanization.

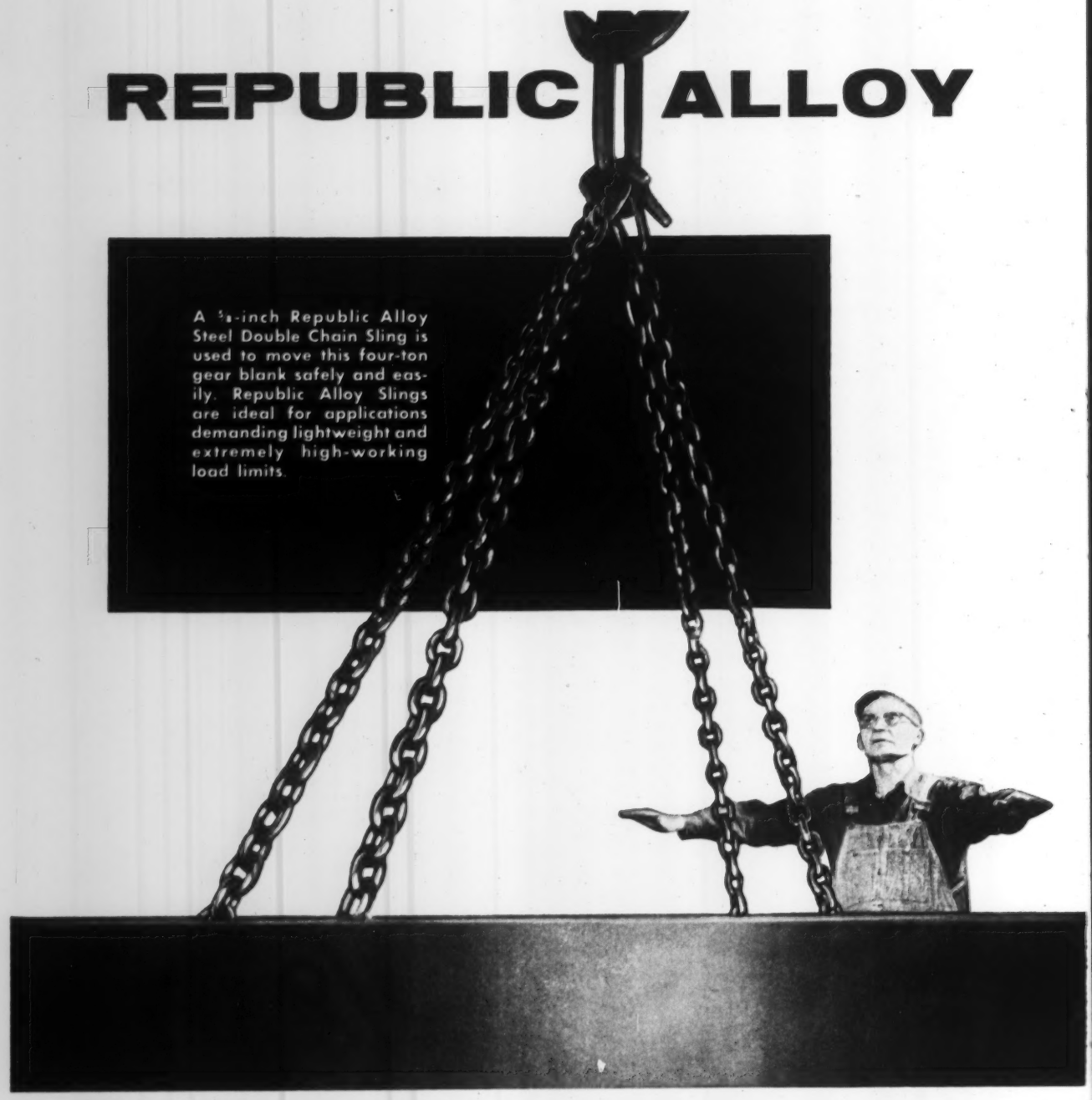
HEADQUARTERS FOR CHAINS, SPROCKETS is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Write for 342-page Catalog 950.

LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.251

REPUBLIC ALLOY


A ⅝-inch Republic Alloy Steel Double Chain Sling is used to move this four-ton gear blank safely and easily. Republic Alloy Slings are ideal for applications demanding lightweight and extremely high-working load limits.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

STEEL CHAIN SLINGS

Are Safe, Strong, Lightweight, Easy to Handle

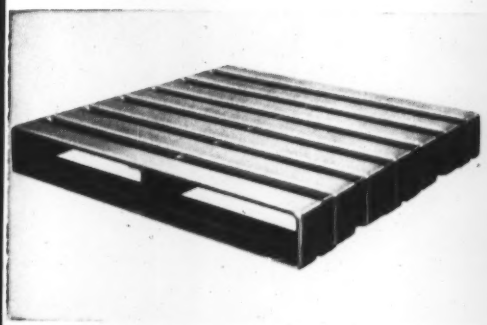
For hazardous, heavy-duty lifting and overhead materials handling, nothing exceeds the modern chain sling made from *alloy steel.* This means it is one of the safest, strongest and toughest pieces of equipment you can have around the shop.

Republic enters the alloy chain sling picture in three ways. (1)—Republic is the world's largest producer of alloy steels. (2)—The high strength-to-weight ratio and corrosion-resistance of Republic Alloy Chain have encouraged the use of smaller and lighter chain slings to carry heavier loads safely. Also resulting in greater efficiency, longer service life and ultimate economy. (3)—Craftsmen at Republic's Bolt and Chain Division form the alloy steel into chain, then into chain slings engineered for the highest degree of safety. Each sling is proof tested and warranted to meet or exceed specifications.

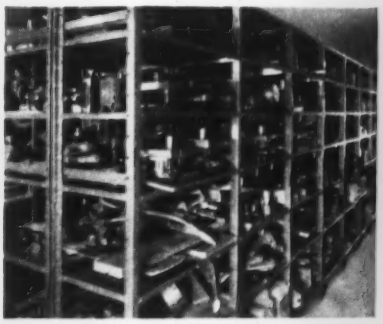
Republic Alloy Chain is made from special analysis open hearth steel, quality controlled from ore to finished product. It is heat treated to develop the highest possible tensile strength and maximum resistance to wear, shock, strain and work hardening. Stress relieving or reheat treating is unnecessary.

Your Republic Chain Distributor has complete information on alloy slings, high test steel and wrought iron slings, as well as fittings, and accessories.

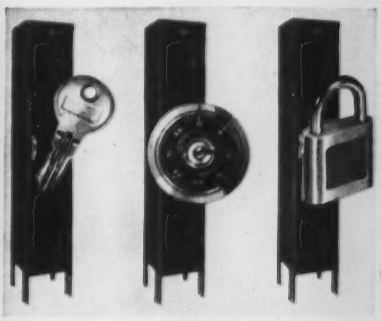
This New Republic Catalog contains complete information and the latest, up to date specifications on Welded Chain, Accessories and Assemblies. It's a colorful, 62-page book loaded with everything you need to know about welded chain. Order your copy from your Republic Chain Distributor. Or write us direct. Ask for Catalog 701.



SAFETY DIRECTORS APPROVE OF REPUBLIC STEEL PALLETS. There are no sharp edges or projections to injure workmen or damage containers. Republic Pallets are fabricated from steel to eliminate maintenance expense — designed to eliminate broken deck members and stringers, protruding fasteners and joint failures. Republic Steel Pallets are available in many styles including the P-16-S Semidouble Face shown above. Write for Pallet Booklet No. 616.



SAFETY IS A BUILT-IN FEATURE OF REPUBLIC WEDGE-LOCK STEEL SHELVING. It is specifically designed for high stacking of enormous weights. Joints actually get tighter as weight increases. And there's no sagging, swaying or buckling. Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. It is completely flexible to meet your changing space requirements and can be assembled quickly and easily.



SAFETY OF EMPLOYEES' PERSONAL PROPERTY is provided by Republic Steel Lockers with a choice of three locking systems — combination — padlock — key operated. These modern steel lockers, available in many types and styles, conserve space and offer clean, safe storage for employees' clothing and valuables. Republic's Berger Division offers a complete locker planning, engineering and installation service. Send coupon for more information.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1697
3120 East 45th Street • Cleveland 27, Ohio

Please send more information on:

☐ Chain Slings ☐ Steel Pallets
☐ Wedge-Lock Steel Shelving ☐ Lockers
☐ Send Welded Chain Catalog 701.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

In a Mess?

CALL "ELL" AND "ESS"!

The best laid new product plans sometimes bog down because of fastening problems.

On paper the product looks good—*is* good . . . is designed in every way for efficiency and salability.

But putting it together may be another story. Special type bolts or nuts may be required to do the job right.

Whenever a "crisis" like this turns up, call in "ELL" & "ESS", the helpful Lamson & Sessions "can do" pair. They can engineer the required fastener, they can make it and many times they save you money.

The LAMSON & SESSIONS Co.

1971 West 85th Street • Cleveland 2, Ohio

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by Curtiss-Wright gives you better quality high alloy castings, forgings, extrusions

. . . and more of them

A wide variety of high precision metal parts — engineered to the needs of the nation's industries for products that serve you in many ways—are in quantity production today at the Curtiss-Wright Metals Processing Division, Buffalo, N. Y. Here experienced metallurgists work with the latest and most advanced forging and machining techniques . . . centrifugal, sand and ceramic casting equipment . . . the world's largest horizontal steel extrusion press, capable of a 24-million pound "squeeze" . . . and with other improved equipment and methods . . . processing stainless and other steels, titanium, and non-ferrous metals into performance-proven parts . . . faster, more economically.

Offering higher precision, higher production . . . improved techniques with unusual and intricate shapes, to higher specifications . . . products of every description, from jet engine blades to the shredder rings for garbage disposal units . . . Curtiss-Wright Metals Processing has become a prime source for American industry.

If you are a manufacturer, write for facts outlining your specific application today. *Branches coast to coast.*

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METALS PROCESSING DIVISION
CURTISS-WRIGHT
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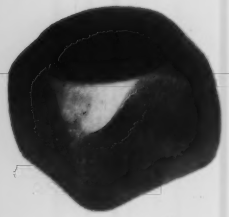
THIS SINGLE-FLANGE TRACK ROLLER IS FORGED

in three blows



BLOW ONE

BLOW TWO

BLOW THREE

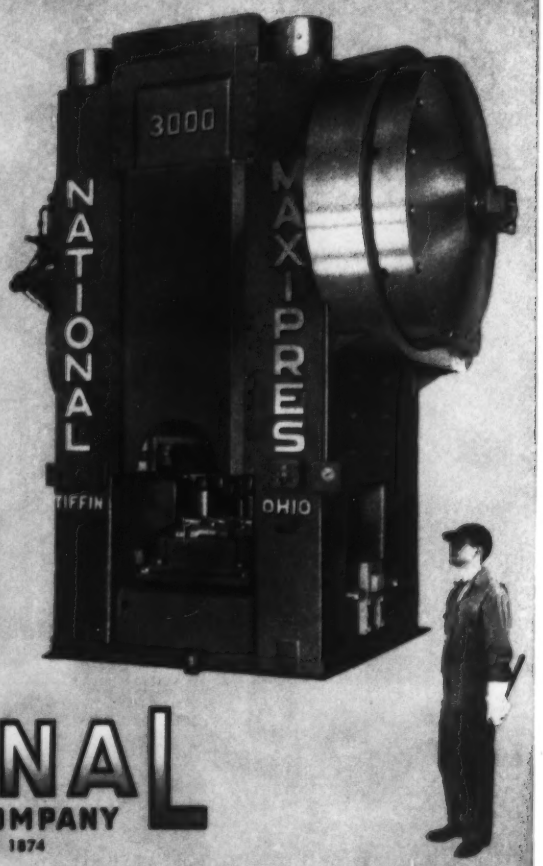
ON A NATIONAL 3000-TON MAXIPRES!

J. H. Williams & Co., Buffalo, N. Y., forges this difficult Caterpillar Diesel Tractor part in 22 seconds on a National 3000-ton MAXIPRES.

Steel stock weighing 45 pounds is conveyed from the furnace to a position in the press convenient to the operator. Finished forgings are then conveyed to the trimming press where flash is removed.

Progressive, experienced forgers, J. H. Williams & Co. relies upon MAXIPRESSES for an important part of its output.

If your problem is to make metal parts faster, stronger, and at lower cost, let us help you solve it. Send us your prints and samples, or, better yet, pay us a visit. No obligation!



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MACHINERY COMPANY

TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

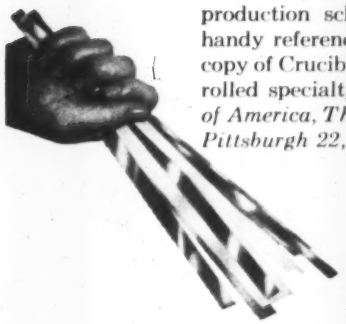
Hartford Detroit Chicago

for dependable deliveries of cold rolled specialty steels —call CRUCIBLE

Crucible is geared to give you *reliable, on-time deliveries* of a wide variety of cold rolled specialty steels—carbon spring, alloy strip . . . coils or cut lengths . . . in the size, finish and temper you specify.

And you're sure of *quality* from Crucible—*fine finish . . . better edges . . . improved flatness.*

So, for prompt deliveries, timed to meet your production schedules—call Crucible. And, for handy reference—mail the coupon for your free copy of Crucible's 32-page fact-filled book on cold rolled specialty steels. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*



Crucible Steel Company of America
The Oliver Building, Mellon Square, Pittsburgh 22, Pa.

I'd like a copy of your 32-page booklet on cold rolled specialty steels.

Name _____ Title _____

Company _____

Address _____

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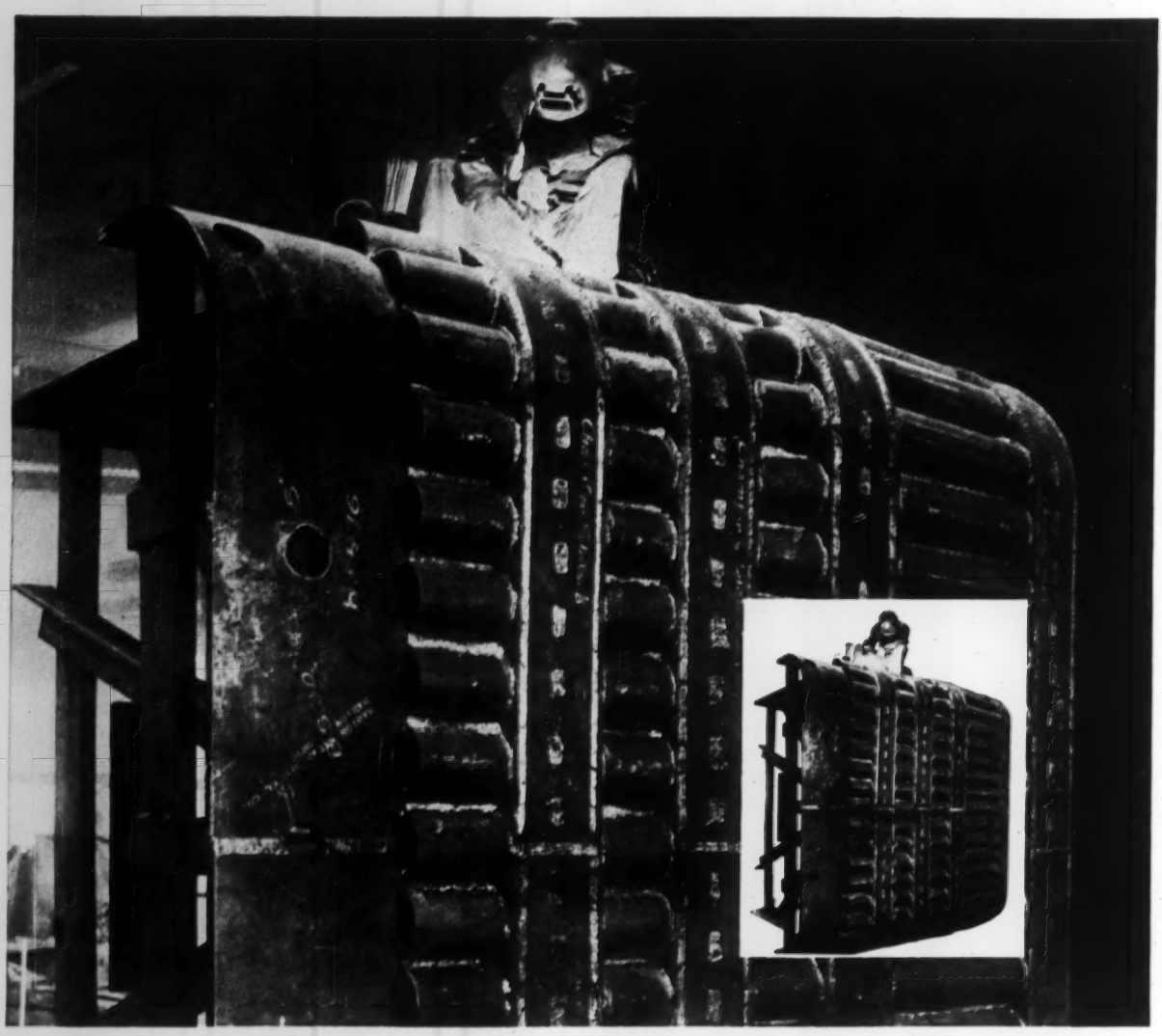
CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



Another huge dipper for a Marion type 5561 stripping shovel — made entirely of Lukens "T-1" steel for extra strength, impact and abrasion resistance — in the shops of Marion Power Shovel Company, Marion, Ohio.

Fabricator of power shovels says:

"LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere. Figure it in your new plans.

Our 24-page illustrated booklet, LUKENS "T-1" STEEL, will help show you the way. Write to Manager, Marketing Service, Lukens Steel Company, 846 Lukens Building, Coatesville, Pennsylvania.

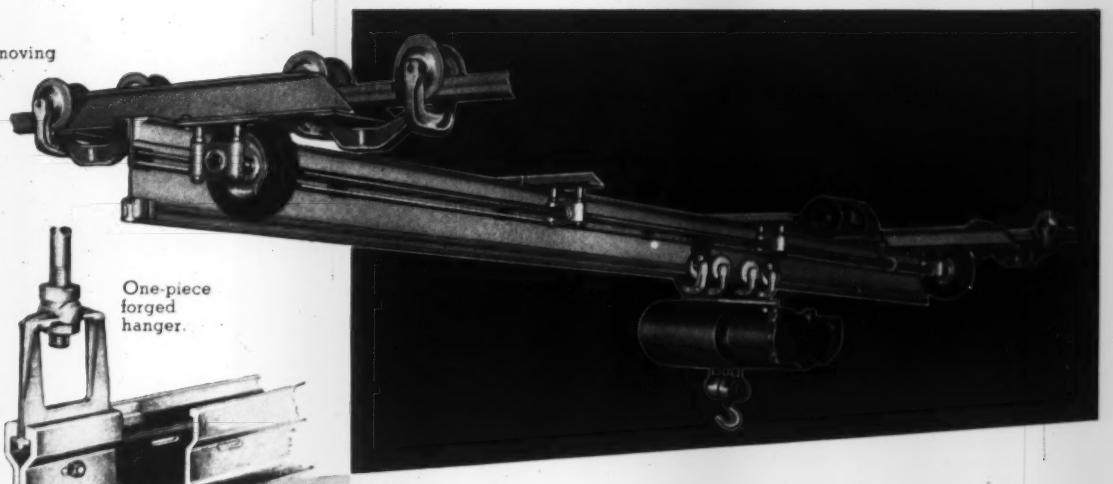
Do it now!

LUKENS "T-1" STEEL

TRADE MARK

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA



Free-moving crane.

One-piece forged hanger.

Twin section track.

Overlapping splice.

Rugged switch construction

Compact electrification

Automatic dispatch carrier.

TAILOR-MADE SYSTEMS
FROM STANDARD PARTS

Standard American Monorail units offering the many advantages illustrated, are combined into systems for handling any type of unit loads.

These systems are available for manual, electric or automatic operation with local or remote control.

Experienced Monorail engineers will tailor-make a cost-saving handling system from standard parts to fit your specific needs.

Write today for Bulletin C-1.

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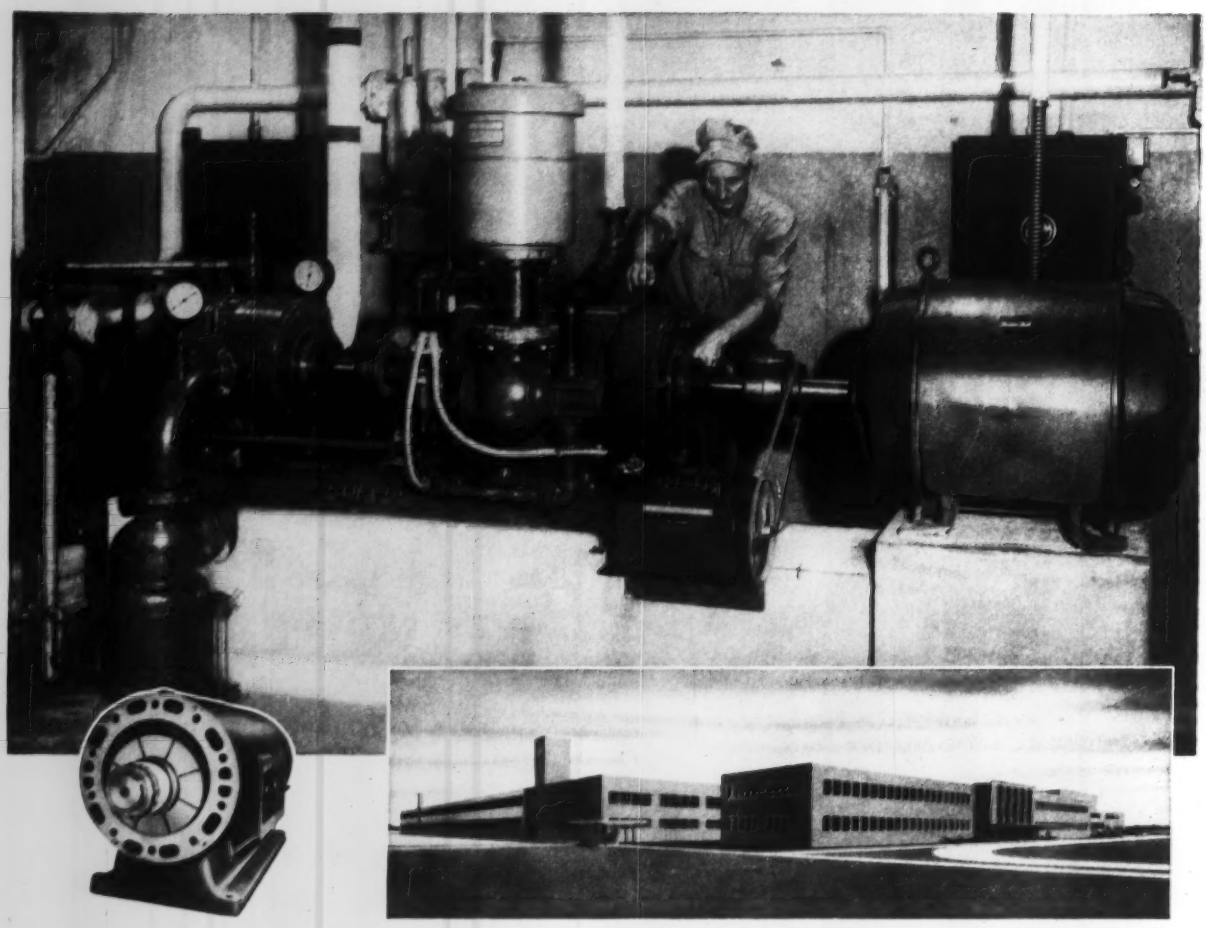
AMERICAN MONORAIL COMPANY

OVERHEAD HANDLING EQUIPMENT

13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



Modern, reliable air power for a modern, efficient plant

When Electric Controller & Manufacturing Company, Division of Square D Company, Cleveland, Ohio, designed and built its new four and one half million dollar plant, they had their sights set on economical production at high-level efficiency.

One of the items given serious consideration was the supply of compressed air, a considerable quantity of which is used throughout the plant. Fuller Company is justifiably proud to be associated with such a plant in being awarded the contract to furnish a Fullery Rotary Two-stage compressor as the main source of general plant air . . . a modern, efficient compressor for a modern, efficient plant. This machine has a capacity of 281 c.f.m., at 100-lb pressure.

Fuller Rotaries do a very big job no matter how tough the going. It's a job that, more and more, is being multiplied throughout all industry, these machines having gained wide acceptance as an efficient, reliable source of air power.

The key to Fuller's long life, and smoother operation, is *rotary motion*, which provides large capacity in relation to size, simple direct drive from motor or internal-combustion engine, minimum of working parts, air-flow free from pulsations, lack of vibration, continuous service with minimum supervision and maintenance. Installation in cramped quarters or on ordinary flooring is simple and practicable.

For a full description of Fuller Rotary Compressors and Vacuum Pumps, we would like to send you a copy of Bulletin C-5A. Write for your copy today.

FULLER COMPANY

160 Bridge St., Catasauqua, Pa.

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C-299
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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

CHICAGO CONCRETE ON THE JOB IN HOURS

500 TONS OF METAL BLASTED FROM SCALE PIT

What do you do when a mixer accidentally pours 500 tons of molten metal into the scale pit of an open hearth shop, putting the mixer completely out of production?

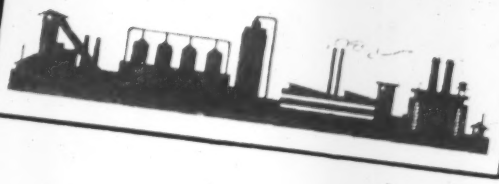
At 3:00 P.M. on a Wednesday in April, 1953 that question was put to CHICAGO CONCRETE. Although the job was over 2,000 miles away, a representative was on the scene appraising the damage in a matter of hours. Simultaneously he ordered out the manpower and equipment necessary to repair the damage while setting to work available manpower in cleaning up. Then . . . coupling the experience bred of 35 years of operation with the judicious use of dynamite, CHICAGO CONCRETE went to work. WITHIN DAYS THE ENTIRE MASS WAS REMOVED AND THE MIXER READY TO RETURN TO ITS JOB.

PRODUCTION TIME SAVED . . . 35 DAYS

By tried-and-proven-safe methods, CHICAGO CONCRETE removed that 500 tons of metal from the scale pit — taking care to safeguard the mixer itself throughout the entire operation. The savings to this mill in "down-time" was literally tens of thousands of dollars. This is another of many emergencies handled by CHICAGO CONCRETE every day, every week . . . handled by experienced men employing the utmost speed. You, too, can depend on CHICAGO CONCRETE in ANY emergency

CHICAGO CONCRETE CONSTRUCTION

Regardless of the size of the job — from a minor masonry, steel or foundation repair, to a complete furnace rebuild, CHICAGO CONCRETE offers you the know-how and facilities to handle any job. CHICAGO CONCRETE CONSTRUCTION COMPANY offers a COMPLETE industrial construction service . . .



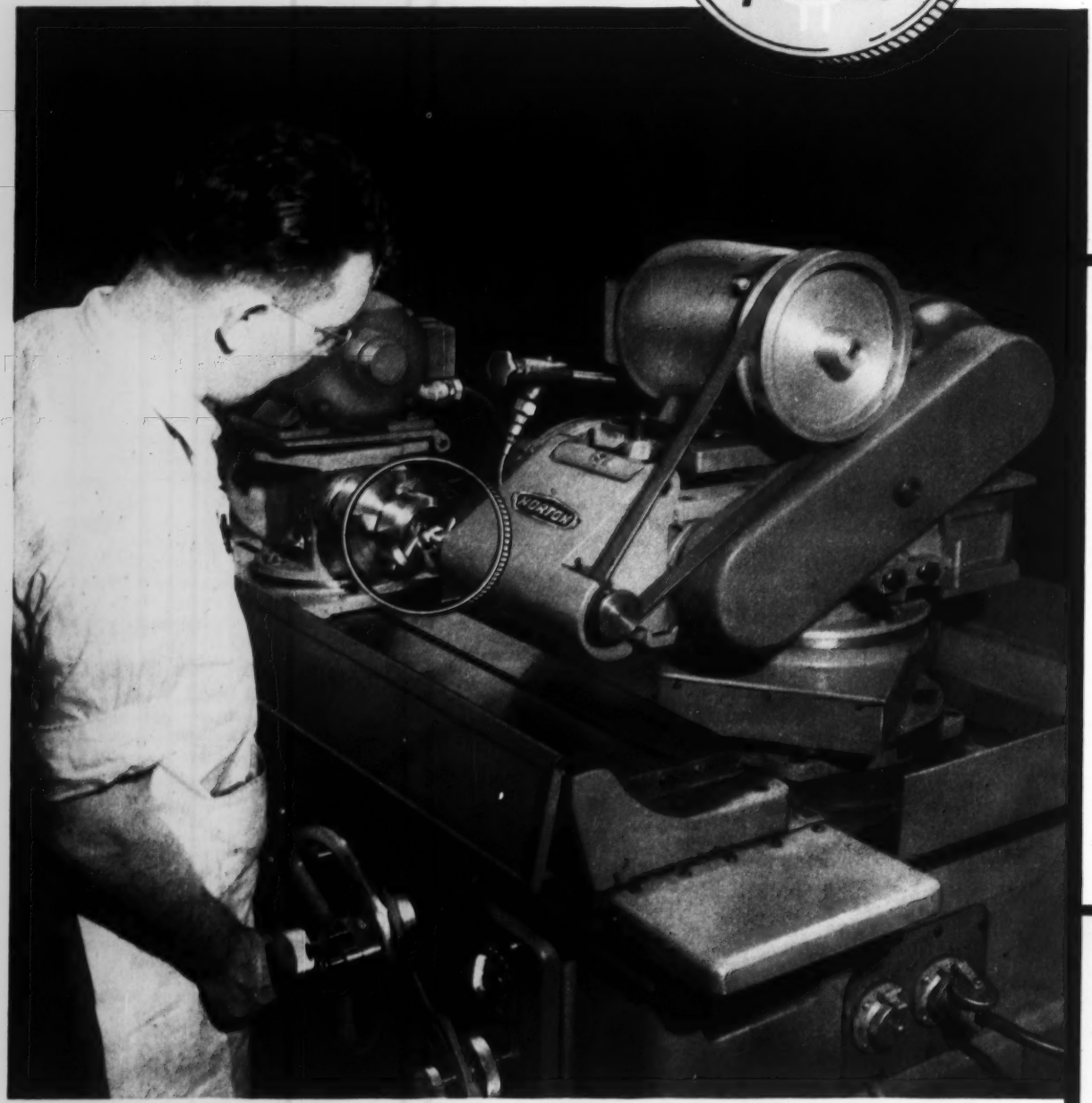
CHICAGO CONCRETE BREAKING CO.

12233 S. AVENUE "O", Chicago 33, Ill., BAyport 1-8400

PITTSBURGH AREA - 213 Corey Ave., Braddock, Pa., Electric 1-1656

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS

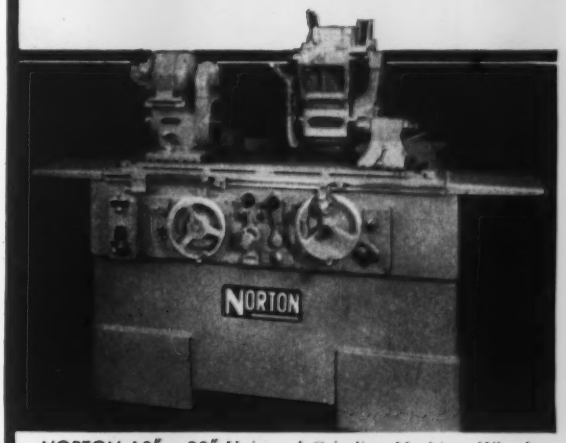
Quicker set-ups... increase your profits ...



HE CAN CHANGE-OVER FAST from this internal grinding set-up on the Norton 10" x 20" Universal Grinder. The internal grinding spindle, permanently hinged to front of wheel slide, swings up out of the way — and he's ready for external, face or angular wheel slide jobs.

on many different grinding jobs

Norton 10"x 20" and 10"x 24" Universal Grinding Machines are famous for versatility, accuracy and fast, smooth performance



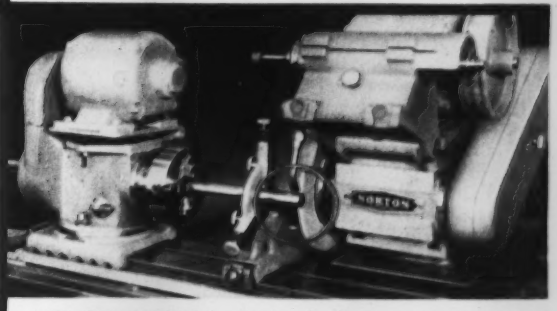
NORTON 10" x 20" Universal Grinding Machine. Wheel head swivels 360°. Internal spindle hinged to front of slide and swings up out of way when grinding external work. One of many machines available under the Norton Lease and Purchase Financing Plans that enable you to modernize while conserving your capital. Particulars on request.

Want a multi-purpose grinding machine that will add the time-and-money saving "Touch of Gold" to many grinding jobs — from rough cuts to finest precision finishing? Here's your answer:

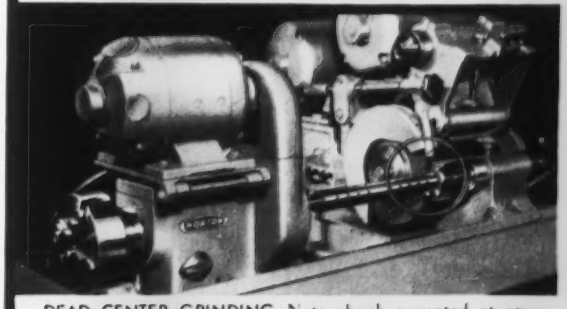
Norton 10" x 20" and 10" x 24" Universal Grinders are designed for **external,** internal, face and angular wheel-feed grinding — **and** they're top performers on every job in their wide range.

Head and footstock are interchangeable, for simplified set-ups on jobs involving shoulders or spacers, especially on angular grinds. Set-ups are made easier on chucking jobs by the D1-3" camlock nose on one end of the headstock spindle, and provision for permanent mounting. The headstock is easily swiveled 180° to change from dead center to chucking work. And the SWIVALIGN Dual Electric Indicator — an optional extra — assures precise swivel table settings, quickly and easily.

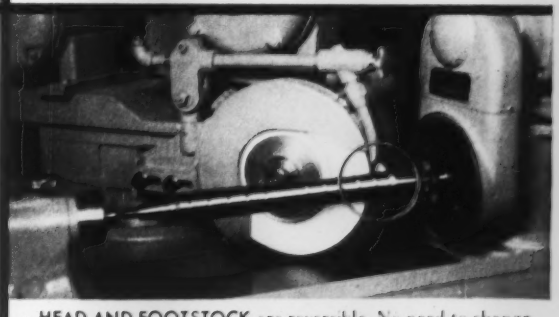
For complete facts, see your Norton Representative, or write for Catalog 170-3. And remember: only Norton offers you such long experience in both grinding machines and grinding wheels to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Massachusetts.



HOLLOW SPINDLE in headstock allows work up to 1" diameter and larger than machine to be passed clear through.



DEAD CENTER GRINDING. Note chuck mounted at opposite end of head, a real set-up time saver.



HEAD AND FOOTSTOCK are reversible. No need to change wheel and drive to the other end of spindle.

To Economize, Modernize with NEW

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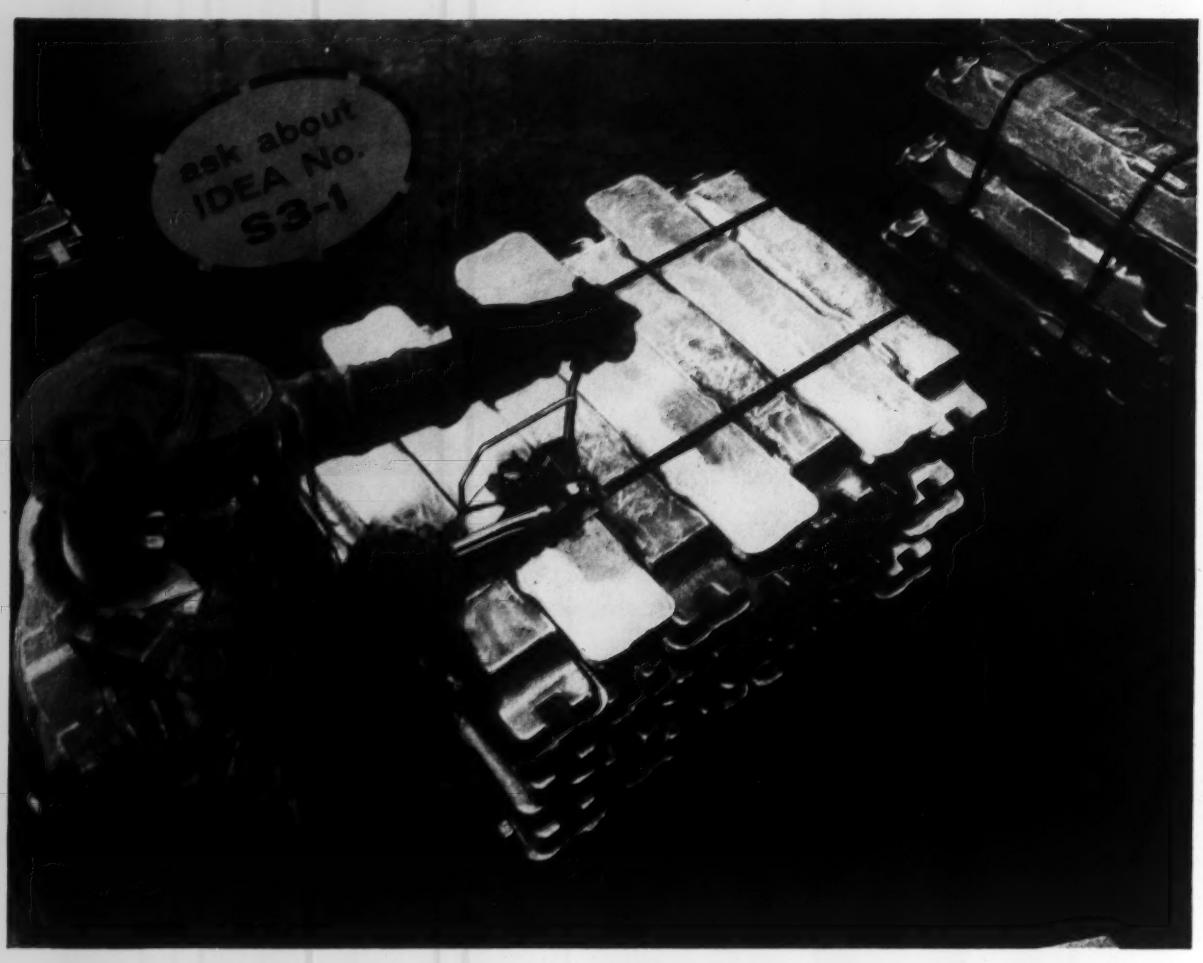
GRINDERS and LAPPERS

Making better products...to make your products better

District Offices: Worcester • Hartford • New York Area, Teterboro, New Jersey • Cleveland • Chicago • Detroit

In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes



Call your AIM* . . . as Alcan did . . .

Steel strapping aluminum ingots aids customers

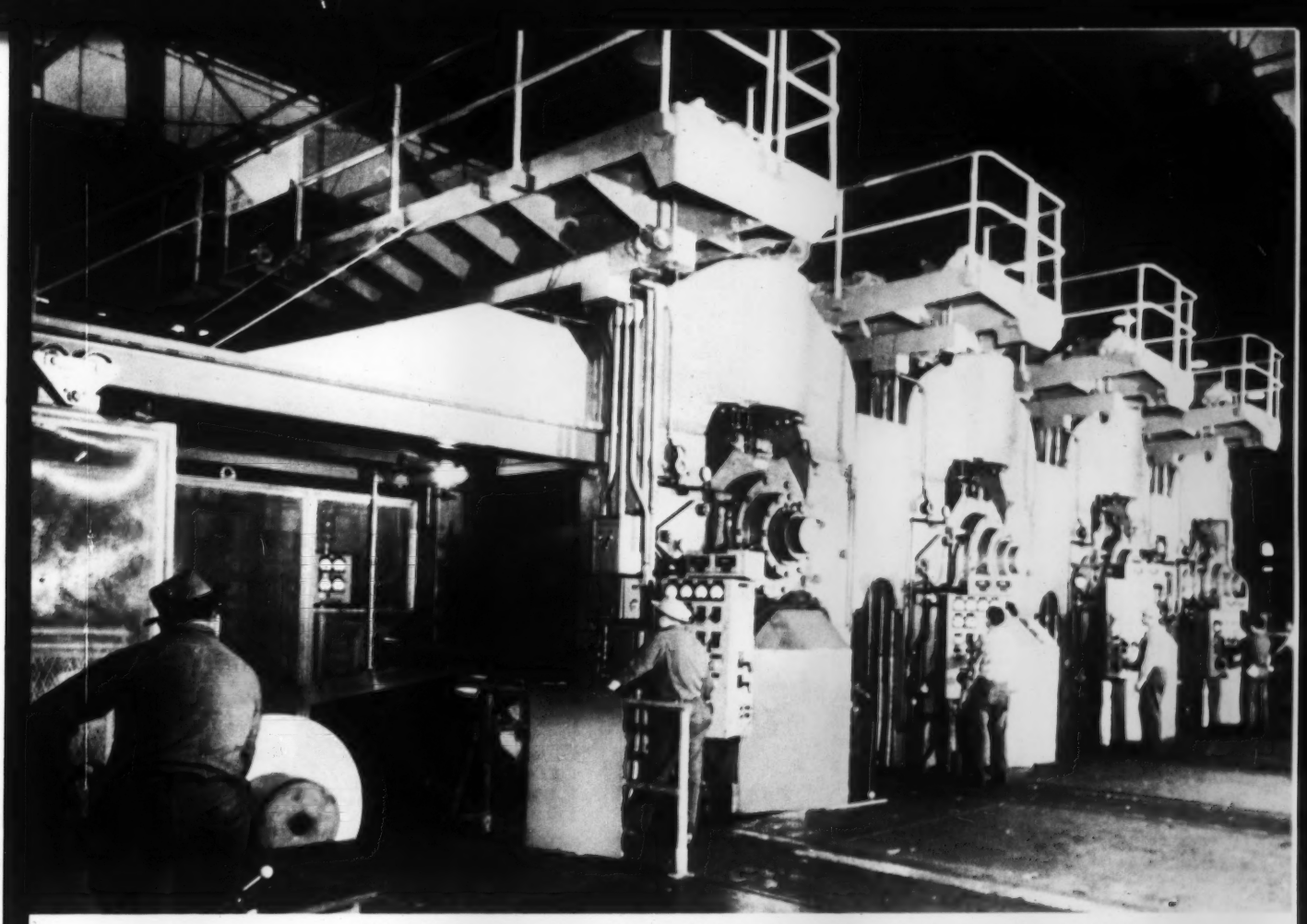
Acme Idea Man, Art Rochette, worked with Alcan technical men on this problem.

ALUMINUM COMPANY OF CANADA, LTD., Montreal, P. Q., modified its method of bundling ingots and improved freight car bracing techniques for added customer service. The new procedures insure delivery of intact, easily-handled bundles of ingots at Alcan's customers' plants. This lading protection advance is an example of how Alcan technical men and the Acme Idea organization cooperated to determine and prove a better packing and shipping method. (Idea No. S3-1.)

As a result of the Acme Idea method, 41 aluminum ingots are securely nested and bundled with Acme Steel Strapping. Using new freight car bracing techniques that help prevent disruption, the bundled ingots arrive at destination intact and are easily handled by lift truck. Car loading is faster and easier while unloading and storing by Alcan's customers is speeded up, more economical.

***Call your Acme Idea Man.** He will be glad to show you his file of time and money saving ideas. Write: Dept. SDS-116, Acme Steel Products Division, Acme Steel Company, 2840 Archer Ave., Chicago 8, Ill., In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Avenue, Toronto 13, Ont.

ACME STEEL **STEEL STRAPPING**



This 66" four-stand tandem cold strip mill at Pittsburgh Steel operates at speeds up to 4190 fpm maximum, has 17,700-hp total drive motor capacity.

Higher speed . . . more on-gauge strip

with Westinghouse Magamp* regulators on coordinated mill drive systems

In March, 1954, the first tandem cold reduction strip mill controlled entirely by Westinghouse Magamp magnetic amplifier regulators was installed at the Pittsburgh Steel Company, Allenport, Pennsylvania. This control's performance since then has resulted in higher permissible operating speeds and more on-gauge strip. Practically no adjustment or maintenance has been required on the mill stand and reel regulating equipment.

Two other four-stand tandem mills with individual generator power supply and all Magamp control are operating successfully, and equipment for four additional mills is being manufactured or installed.

*Trade-Mark

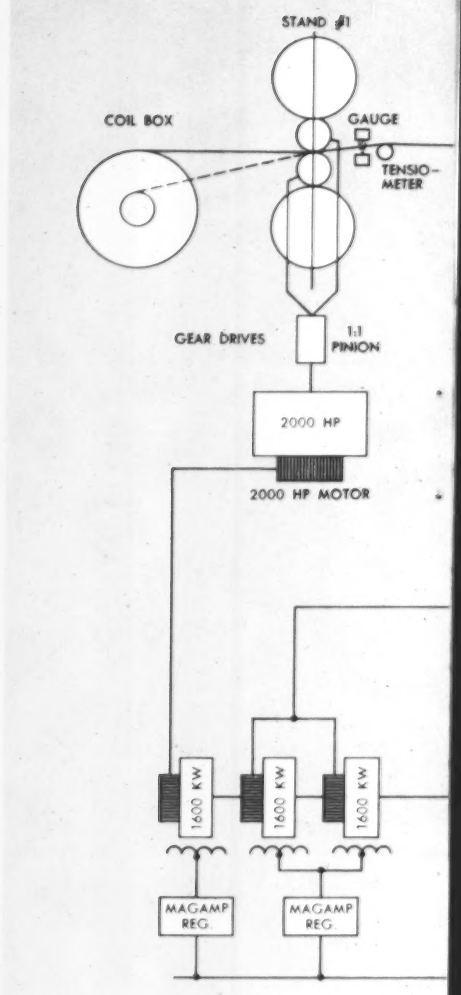
See how Westinghouse coordinated drive systems are Magamp controlled for greater productivity

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

Precise Magamp power control yields . . .

More on-gauge strip at 6000 fpm and beyond



More on-gauge strip during acceleration, deceleration and rated speed rolling are yours with Westinghouse Magamp regulators . . . even with the trend toward greater power application. Results are fewer waste ends, increased productivity.

A Magamp regulator system delivers optimum over-all mill performance because it properly regulates and improves the response characteristics of mill and reel motors and power supply generators.

Magamp's high amplification and extremely short response time assure accurate generator voltage control. Operation from 400 cycles gives fast response and inherent stability without complex or critically adjusted damping circuits. Here's how the system works:

DRIVE ARRANGEMENT—Working rolls in mill stands one and two are driven together through pinion stands. Upper and lower rolls in stands three, four and five are driven separately through offsetting speed-up gears, the 6000-hp #5 drive consisting of two 3000-hp, double-armature motors. Winding reel motor is 1500-hp, triple armature. Each stand and reel drive is supplied from separate generators, on two motor-generator sets with duplicate 12,000-hp synchronous driving motors.

MAGAMP REGULATOR CONTROL—Generator(s) for each stand and reel power supply is controlled by a Magamp voltage regulator, operating on 400-cycle, three-phase supply from an alternator set.

AUTOMATIC GAUGE CONTROL—Strip thickness gauge at stand one controls stand one screwdown to minimize variations in starting hot strip and to feed uniform strip to rest of mill. Gauge at stand five controls stand five motor speed, and tension between stands four and five to maintain constant gauge of finished strip.

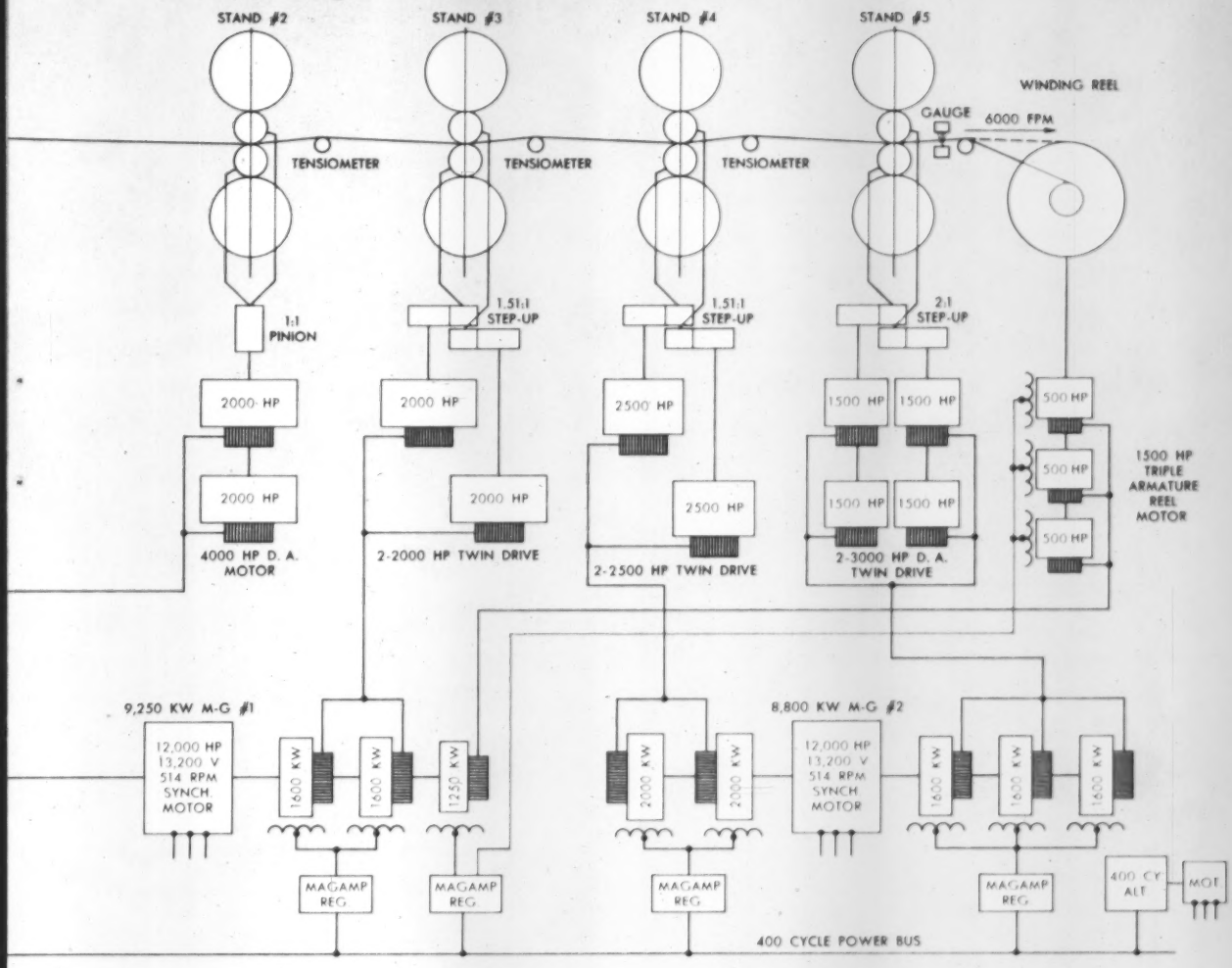
TENSIOMETERS—Units between stands indicate total tension and difference in tension between two edges of the strip.

Motor room for 66" tandem cold strip mill.

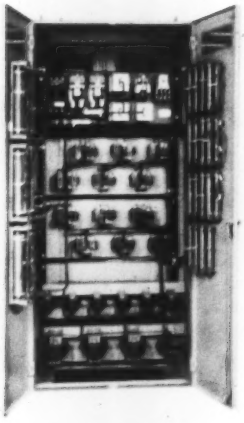
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

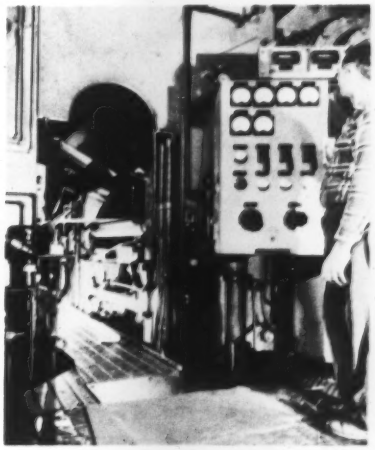
6000 fpm tandem tin plate mill



A 48"-wide five-stand mill like this is now under construction for the Wheeling Steel Corporation. It will have 22,500-hp total drive capacity to produce tin plate and heavier strip at speeds up to 6050 fpm.



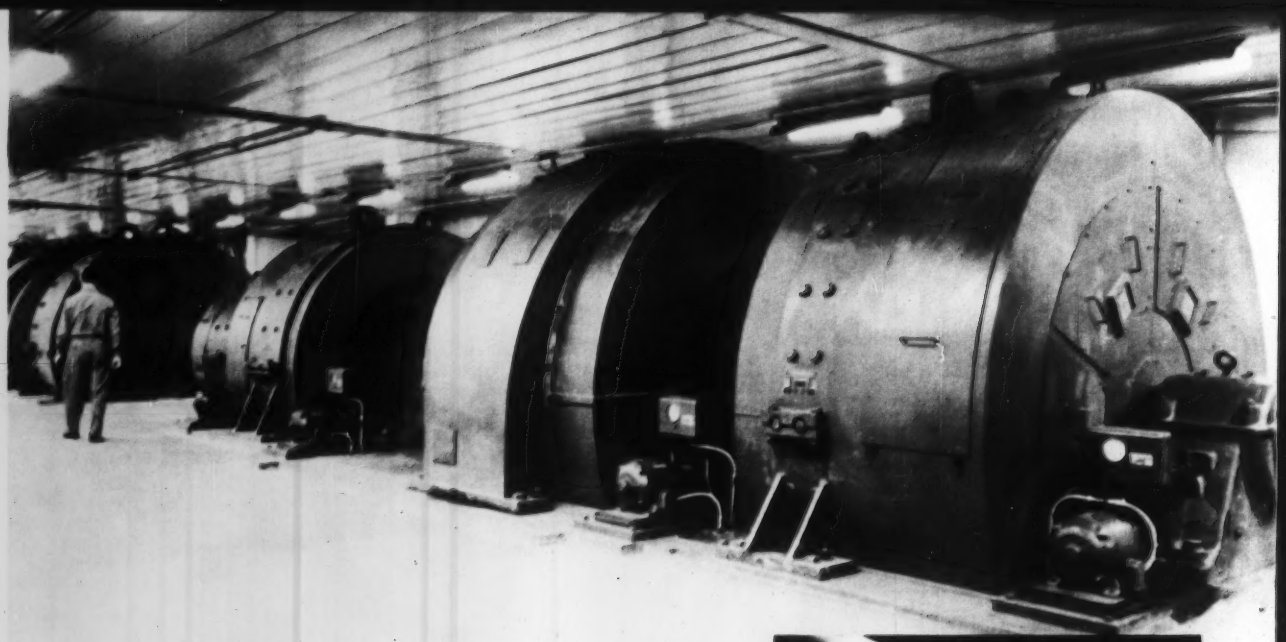
Magamp regulator cabinet.



Tensiometer between mill stands.

Progressive users of Magamp regulator control on tandem cold strip mills

PLANT	YEAR	STANDS AND WIDTH	DELIVERY FPM	TOTAL HP
Pittsburgh Steel Co. Allenport, Pa.	1954	4—66"	1595/3190	17,700
Alan-Wood Steel Co. Conshohocken, Pa.	1954	4—32"	1100/2293	6150
Empire Steel Corp. Mansfield, Ohio	1955	4—52"	747/1868	8100
Usinor Montataire, France	1956	4—66"	1375/3630	19,450
Nonferrous—Ohio	1956	4—32"	850/2075	4400
Steel Mill—Ohio	1957	3—80"	747/1670	13,000
Wheeling Steel Corp. Yorkville, Ohio	1957	5—48"	2750/6050	22,500



Westinghouse Exclusive!

Thermalastic® insulation excels in punishing steel mill duty

Twenty percent greater dielectric strength, ten times greater voltage endurance, 30 times greater tensile strength . . . that's Thermalastic, an amazing insulation available exclusively from Westinghouse.

Thermalastic shrugs off moisture, high voltage and dirt . . . helps Westinghouse motors and motor-generator sets better withstand severe steel mill operating conditions.

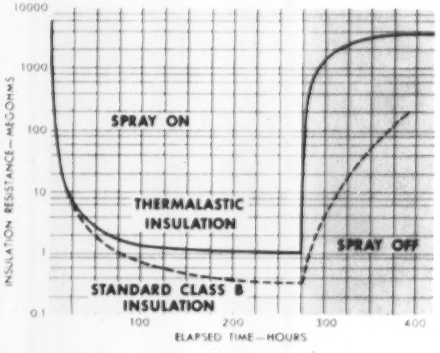
A chemically stable, highly moisture-resistant impregnating resin is used in Thermalastic. This, plus a high degree of fill achieved in the impregnating process, gives Thermalastic extraordinary properties that extend its life in hard service.

Remember, too, Westinghouse switchgear, control centers, ventilation equipment, and gearing are excellent working partners for your Westinghouse coordinated mill drive systems.

From planning to design, installation and start-up . . . Westinghouse is at your service. An experienced Westinghouse team will accept unit responsibility, and work with your engineering staff and consulting engineers in setting up your tandem mill drive.

Contact your Westinghouse sales office for further details. Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania. MP-3046

Thermalastic-insulated Westinghouse motor-generator sets (top photo) for 66" four-stand tandem cold strip mill.



Results of typical laboratory spray test demonstrate superior moisture resistance of Thermalastic compared to regular insulation.

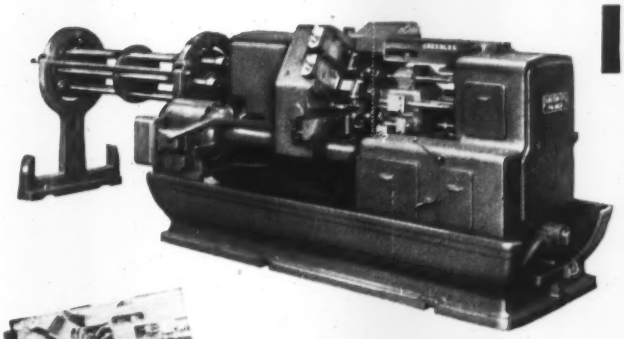
WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

1. Simplified cross-slide camming
2. Interchangeable cross-slide tool holders
3. Quick-adjusting stroke mechanism
4. Rapid speed and feed changes
5. Wide-open, easily reached tooling area
6. Built-in threading feed and drive
7. Easily accessible main toolslide holders
8. Stationary type collets changed quickly

eight big reasons why you get *Fast Setups* on GREENLEE BAR AUTOMATICS

In plant after plant countless hours of setup time are saved each year on Greenlee Bar Automatics. Similar savings in time and money can be achieved in your own plant. Greenlee has on-the-job case studies to prove it. Whether your responsibility lies in the field of management . . production engineering . . . or purchasing you owe it to yourself and your company to call in the Greenlee man. Let him show you why and how faster setups on a Greenlee pay off in greater profits.



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The low coefficient of friction and longer service life of Garlock Teflon seals has been used to great advantage by a large producer of power steering equipment. The switch to Teflon substantially reduced both manual turning effort and wear in the power steering mechanism.

These seals were designed by Garlock engineers to do a particular job better. They are typical of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet every conceivable need . . . the *only* complete line available. That's why your Garlock representative can give you *unbiased* recommendations. Call him at the start of your next project, his experience will save you time and money. Write today for new Garlock Teflon Catalog AD-155.

*DuPont Company Trade-mark

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For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada

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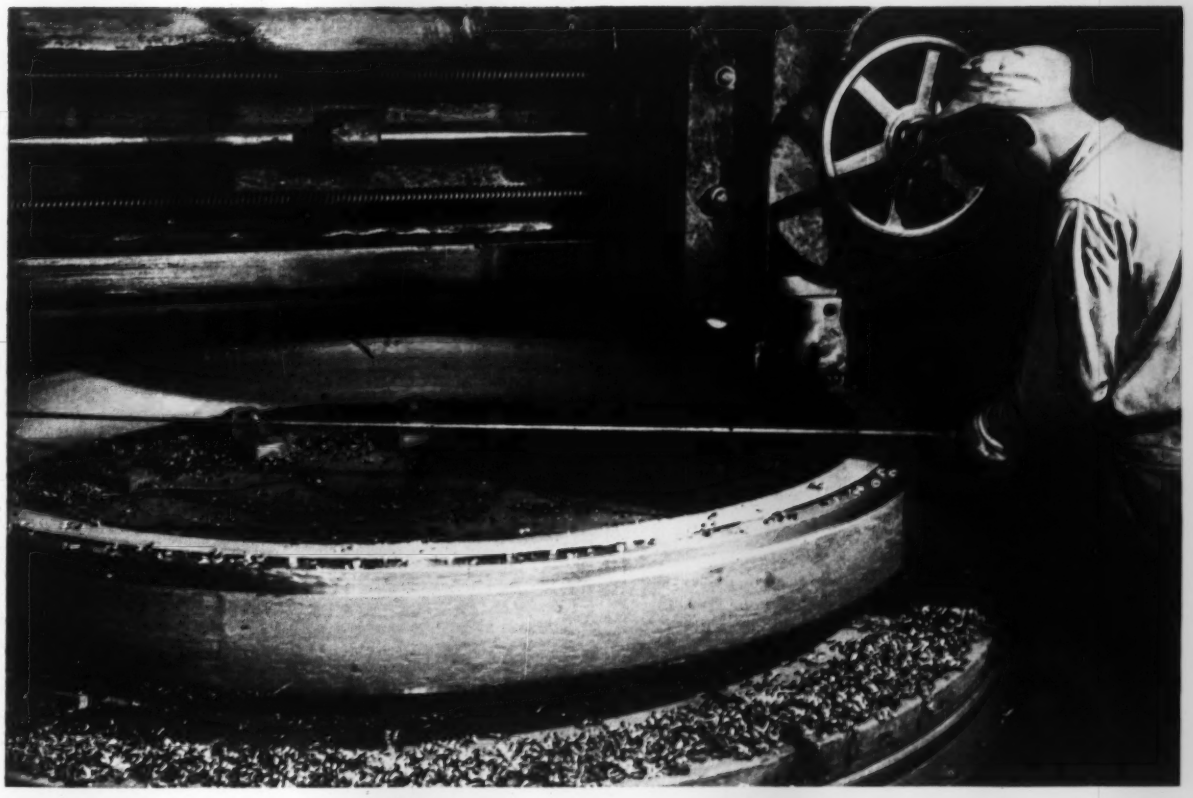

Here's proof of Hi-Qua-Led's performance in ALCO seamless forged and rolled rings:

"Roughing cuts reduced by ½
. . . cutter costs by ⅓
. . . running time by 12¼ hours
. . . surface finish: greatly improved"

Tremendous savings in machining time and reduced tool costs are reported by our ring customers who have used ALCO's new Hi-Qua-Led Steel*. Here's what one customer reports:

"The leaded steel machined successfully using half the normal number of roughing cuts and at greatly increased speeds. Surface finish was greatly improved. Normal surface finish on 4140 steel was from 80 to 125 rms, while surface finish on the two test gears was from 40 to 60 rms. Total running time per gear was reduced by 12.18 hours. Cutter costs were reduced by approximately one-third."

Make the comparison right in your own shop. Let ALCO furnish you a trial lot of Hi-Qua-Led steel rings along with your usual grade. See the advantages it brings in faster machining, with less power, reduced tool wear. Hi-Qua-Led may be obtained in any size ALCO forged ring. For complete information contact your nearest ALCO Sales Office.

Other customer tests of Hi-Qua-Led's machinability are equally impressive:

- **41L37 — Brinell Hardness 290-330**

  Turning — Speed increased from 2¾ rpm to 6 rpm. Depth cut: from ⅛ in to 3/16 in. Machining time improved: 69 per cent.

  Teeth-Cutting — Tool life increased 1600 per cent. Tool wear decreased 95 per cent.

- **41L40 — Brinell Hardness 285-302**

  Turning — Speed increased from 17 rpm to 25 rpm. Machining time improved 47 per cent.

  Teeth-Cutting — Tool life increased 427 per cent. Tool wear decreased 77 per cent. Machining time improved: 41.2 per cent.

Your copy of "Facts on Leaded Steel for Seamless Forged and Rolled Rings," is waiting for you. Just write ALCO Products, Inc., P. O. Box 1065, Schenectady 1, New York.

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NEW YORK

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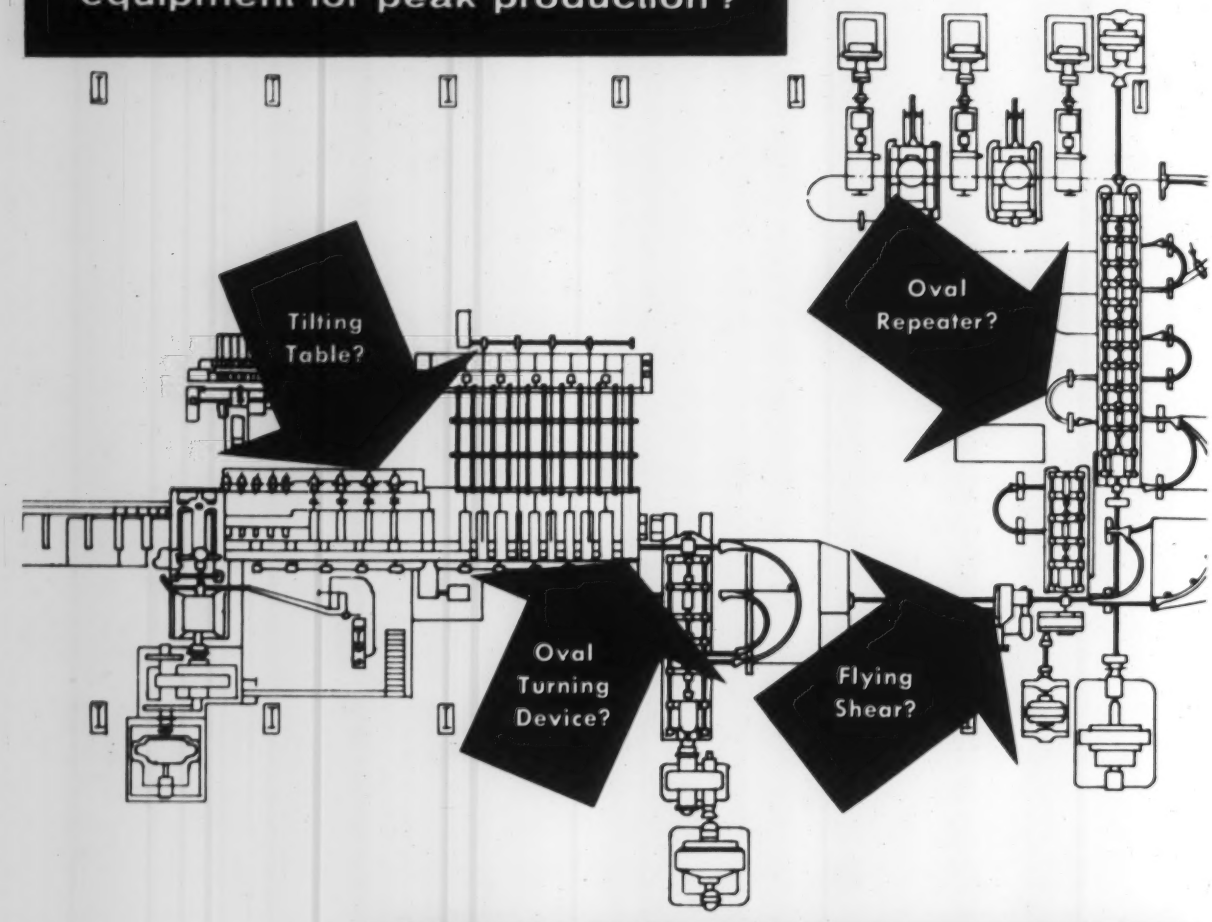
*Trade-mark Reg. applied for. Patent applied for on lead-addition method.

What station in your mill needs specially designed equipment for peak production?



From auxiliary units to complete mills, look to **BIRDSBORO** for new ideas in design and production

DESIGNERS AND BUILDERS OF

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For 59 examples of the latest advanced engineering developments by BIRDSBORO, write today for our new Mill Machinery Brochure, "You're a Steel Specialist . . . ".

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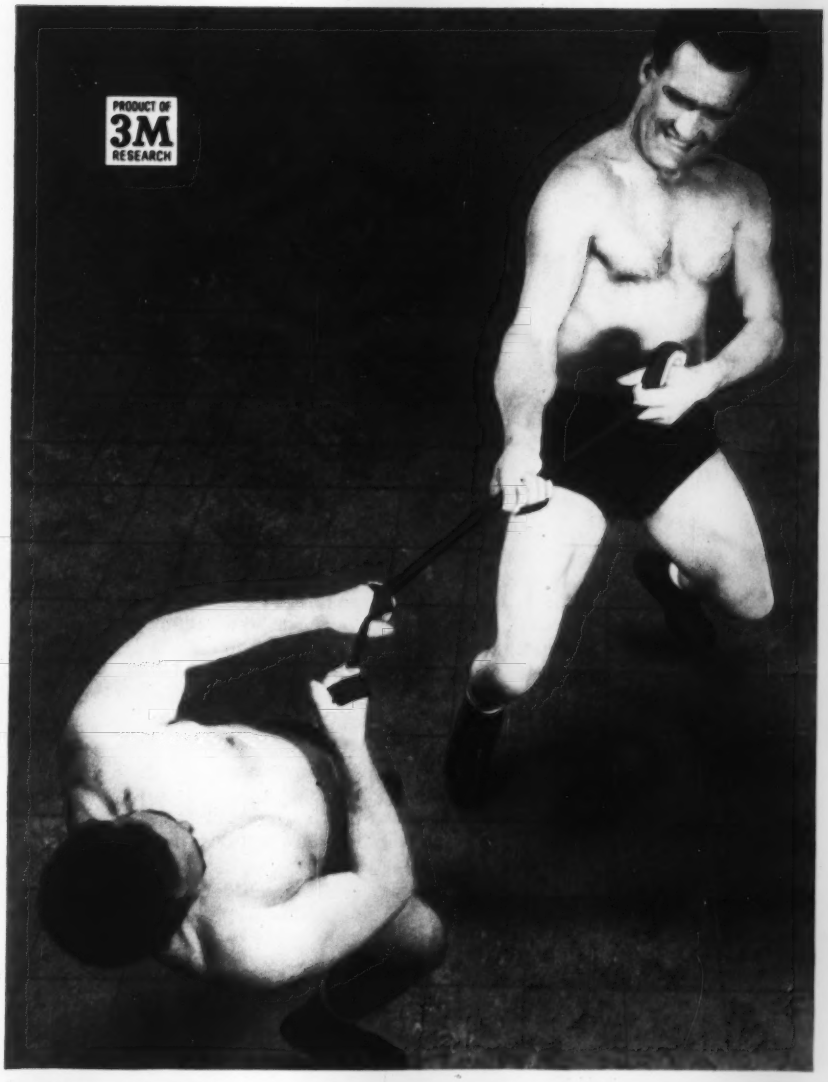

World's strongest tape?

Even 468 lbs. of wrestlers can't break it! "Scotch" Brand Filament Tape is amazingly strong, super shock-resistant. Thousands of filaments imbedded in the pressure-sensitive adhesive give it up to 500 lbs. tensile strength per inch of width. Four colors: Red, Blue, Black, White and Transparent. Ask your regular tape distributor how you can use it for heavy-duty packaging, or write us direct. Always specify "Scotch" Brand, the *quality* tape . . . and *stick* with it!

FILAMENT TAPE . . . *one of more than 300 pressure-sensitive tapes for industry, trademarked . . .*

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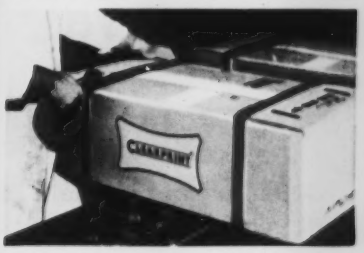
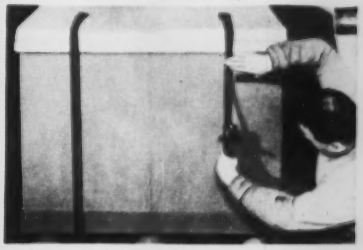
SCOTCH BRAND

Look what you can do with it!



HARD-TO-HANDLE materials, such as paper sheets in bulk, can be easily packaged using "Scotch" Brand Filament Tape. Super-strong tape both seals and reinforces covering.



LARGE cartons and expendable pallets are easily closed and reinforced with "Scotch" Filament Tape. Tape won't cut workmen's hands; won't harm contents; is easily disposed of.

MAKE your own containers for odd-sized or odd-shaped products with fibreboard padding and "Scotch" Filament Tape. "Mirror surface" adhesive sticks at a touch; holds securely.

SEND FOR free booklet showing how "Scotch" Brand Filament Tape can help solve your heavy-duty packaging and materials-handling problems. Write on your letterhead to 3M Co., St. Paul 6, Minn., Dept. GK-116.

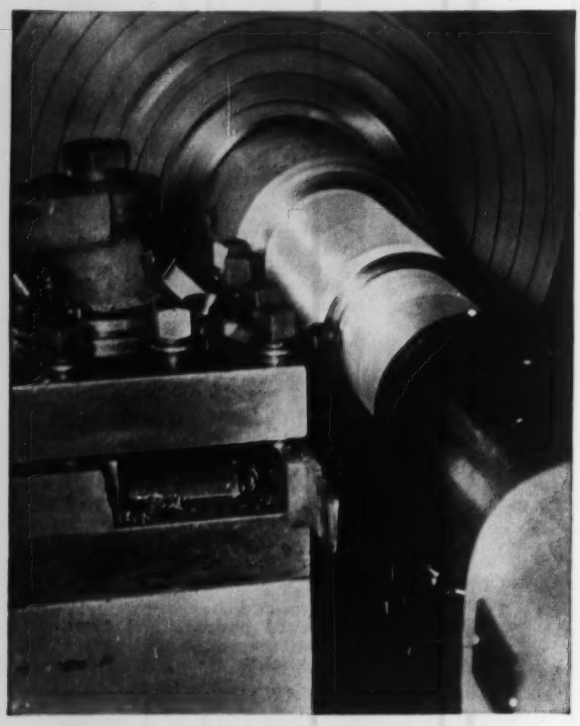
The term "Scotch" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N.Y. In Canada: P.O. Box 757, London, Ontario.

(Advertisement)

More production for your tooling dollar is the reason...

WHY IT PAYS TO SPEND FOR CARBOLOY EXTRA—

If you rely on "Equivalent Grade" Charts to save a few tooling pennies, these facts on carbide costs may save you thousands of production dollars



TESTS ON STAINLESS STEEL VANED ROLLS by a New Hampshire pulp and paper-processing equipment manufacturer demonstrate how the "Equivalent Grade" Charts hide tremendous differences in carbides' production abilities. With Grade "X," production per tool was limited to two pieces per grind. Machine speed had to be held down to protect the carbide.

Switching to Grade 370 brought the manufacturer 8 to 9 pieces per grind. Machine speeds were doubled; 14 hours a day in labor were saved. Result: savings of more than $100 a week, in addition to lower downtime, grinding, and inventory costs.

SO-CALLED "Equivalent Grade" Charts hide the fact that no two carbide grades will produce the same results. Because they classify carbides by broad areas of application, the Charts ignore important differences in production ability.

Thus, they mislead buyers into believing they can safely purchase the cheapest grade listed for a job.

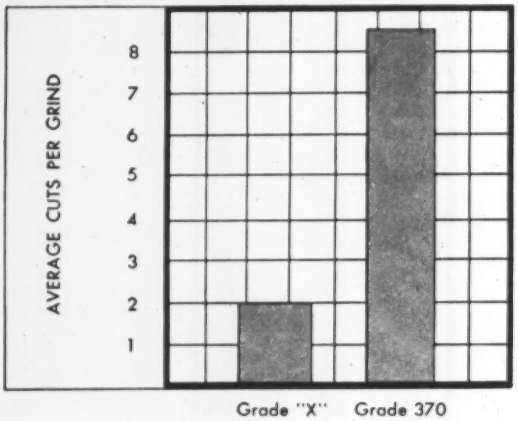
But actual tool-comparison tests have proved conclusively that the production abilities of carbides *do* vary tremendously. Moreover . . . these tests show that the pennies saved by buying on low initial cost often lead to thousands of wasted dollars . . . in lost production, lower machine efficiency, non-productive man-hours.

The case history at left is one of hundreds demonstrating why cost per finished piece – not initial cost – is the only reliable guide to buying carbides.

Results of an actual comparison test

According to the "Equivalent Grade" Charts, any one of several carbide grades could handle the job of machining these rolls. The manufacturer tried Grade "X" first – because it cost 10% less, initially, than Carboloy* Extra-Performance Grade 370.

Grade "X," however, machined only two rolls per day. Grade 370 increased production to 8 or 9 pieces per day (Graph No. 1).

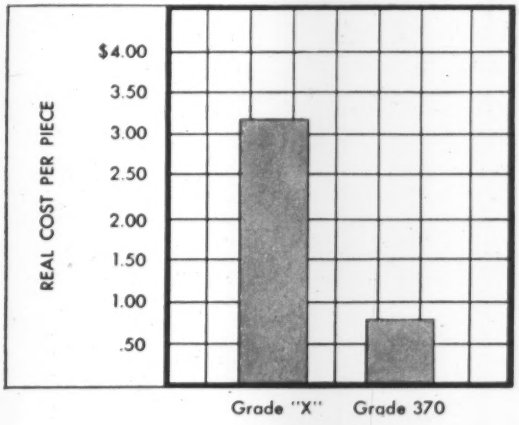


Graph No. 1—Production Ability Comparisons

A FEW CENTS MORE PERFORMANCE CARBIDES

When the *real* cost of the tools was calculated, the manufacturer found the initial saving with Grade "X" was actually *making* him *lose* more than $100 a week. Here's why:

The real cost of Grade "X" was $3.18 per piece machined (2 pieces from a $6.37 tool). The real cost of Grade 370 is just $.82 (average of 8½ pieces from a $7.01 tool). On the weekly production of 42-43 rolls, the saving totals $100.30!



Graph No. 2—Real Cost Comparisons

Yet even this eye-opening figure does not tell the whole story. The Grade 370 tool operated at twice the speed of Grade "X." It helped save the manufacturer 14 hours a day in labor. It provided twice the tool life. It eliminated a special finishing tool.

When these facts were translated into dollars and cents, the manufacturer found that downtime costs were reduced, because the tool remained on the job longer. Grinding costs were reduced, because the tool required less maintenance. Inventory costs were reduced, because a few tools did the work of many.

When added up, these amounted to a considerable saving – yet nothing in the "Equivalent Grade" Charts could have forecast it. These are savings which buying on the basis of initial cost always obscures. These are savings which more than justify spending a few cents more for carbides with extra production ability.

Carboloy Extra-Performance Carbides available for all steel-cutting jobs

Heavy-Duty Grade 370, used in the test above, is one of three Carboloy Extra-Performance Carbides. Together with Medium-Duty Grade 350 and Finishing Grade 330, these grades cover the entire steel-cutting range from roughing to finishing.

Extra-Performance Grades 330, 350, and 370 cost more, initially, because they are made by a unique and more costly process. But their performance so far exceeds conventional carbides that there are actually no "equivalent" grades for any of them. They cannot be fitted into the arbitrarily selected cubbyholes on the "Equivalent Grade" Charts now in common use.

These Extra-Performance Grades easily expose the fallacy of the "Equivalent Grade" Charts, because they are so superior to other steel-cutting grades. But even when attempting to classify conventional grades, the Charts exhibit the same fatal flaw.

Because there is no way of knowing in advance how any grade will perform on the job, we make this suggestion: Always run your own comparison tests *before* you specify a grade. When the results are in, you will find that one grade will bring your plant significant savings in tool costs, machining and labor expense.

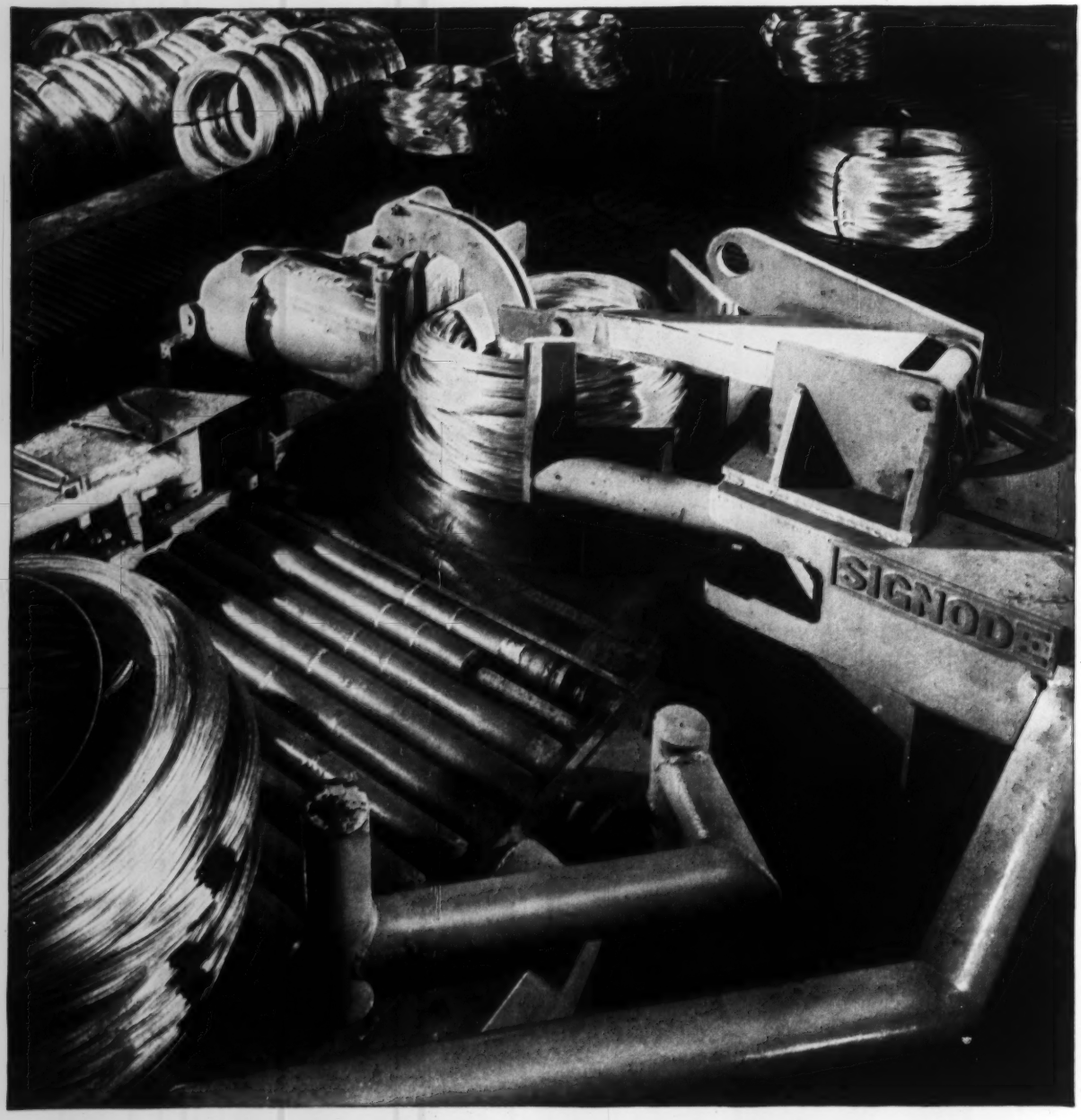
We think you will find *that grade* will be one of the Carboloy Extra-Performance Carbides. But whatever it is, specify it *by name*. Do not settle for an "equivalent" grade.

If you would like a more detailed discussion of the whole problem of Initial Costs vs. Real Costs, and the fallacies of the so-called "Equivalent Grade" Charts, write today for a sales engineer to call on you. Send your request to: *Metallurgical Products Department of General Electric Company, 11141 E. 8 Mile Road, Detroit 32, Michigan.*

CARBOLOY

CEMENTED CARBIDES

*CARBOLOY IS A TRADEMARK OF GENERAL ELECTRIC COMPANY



Strapping can be automatic

This husky Signode machine compresses and straps wire coils automatically. It ties them so tightly that more wire is stored in less space, and coils don't snag or tangle. Other automatic Signode machines bundle pipe and strap packages of many shapes and sizes. For high strength at low cost, you can't beat steel strapping to hold things together or in place. Signode has ways to make your products cost less to handle, store, ship and receive—ways suitable for even the smallest plant. Let a Signode representative show you. No obligation. Just write:

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Offices Coast to Coast. Foreign Subsidiaries and Distributors World-wide.
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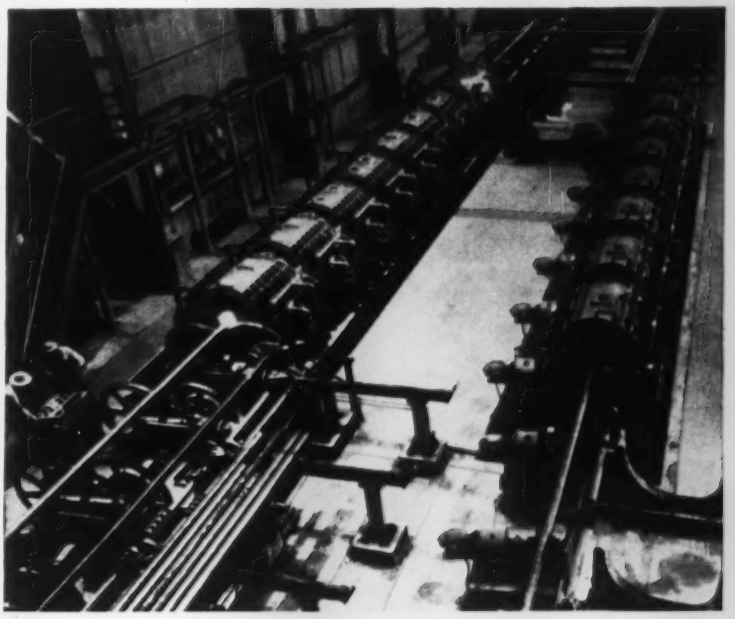
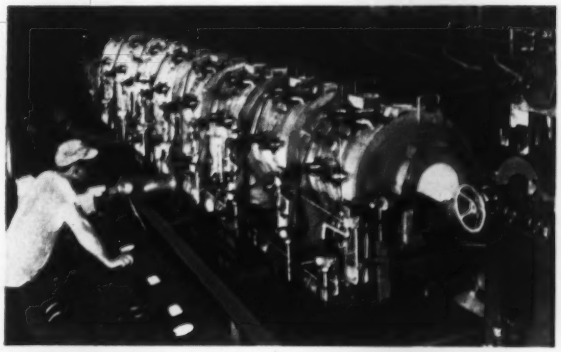
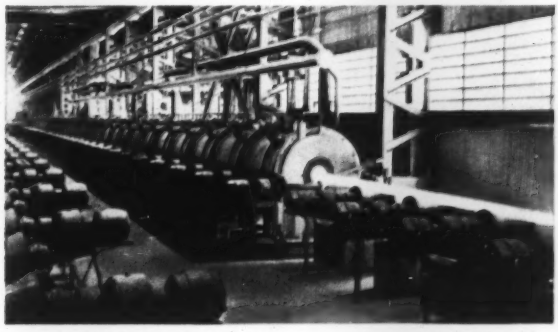
Selas Barrel-Furnace Lines Heat Treat Tubes and Bars . . . in Continuous Operations at Mill Speeds



Continuous hardening and tempering seamless tubes at Colorado Fuel and Iron.



Heating for sizing the heaviest wall seamless tubing produced in the U. S., at Phoenix Iron and Steel.



Normalizing welded tubing in 66 sec . . . compared with conventional practice of 21 min . . . helps Lone Star Steel turn out an improved product, faster.

steel companies use Selas Gradiation® Heating in specially designed barrel-furnace lines to do a wide variety of heat processing . . . to keep pace with high production demands

Selas barrel-furnace lines throughout the steel industry perform their heating jobs as part of in-line continuous production operations, automatically controlled. The compact, space-saving, gas-fired furnaces deliver uniform heating with speed and precision.

Send for informative articles on Selas tube and bar heating installations. Address Dept. 211.

SELAS
CORPORATION OF AMERICA
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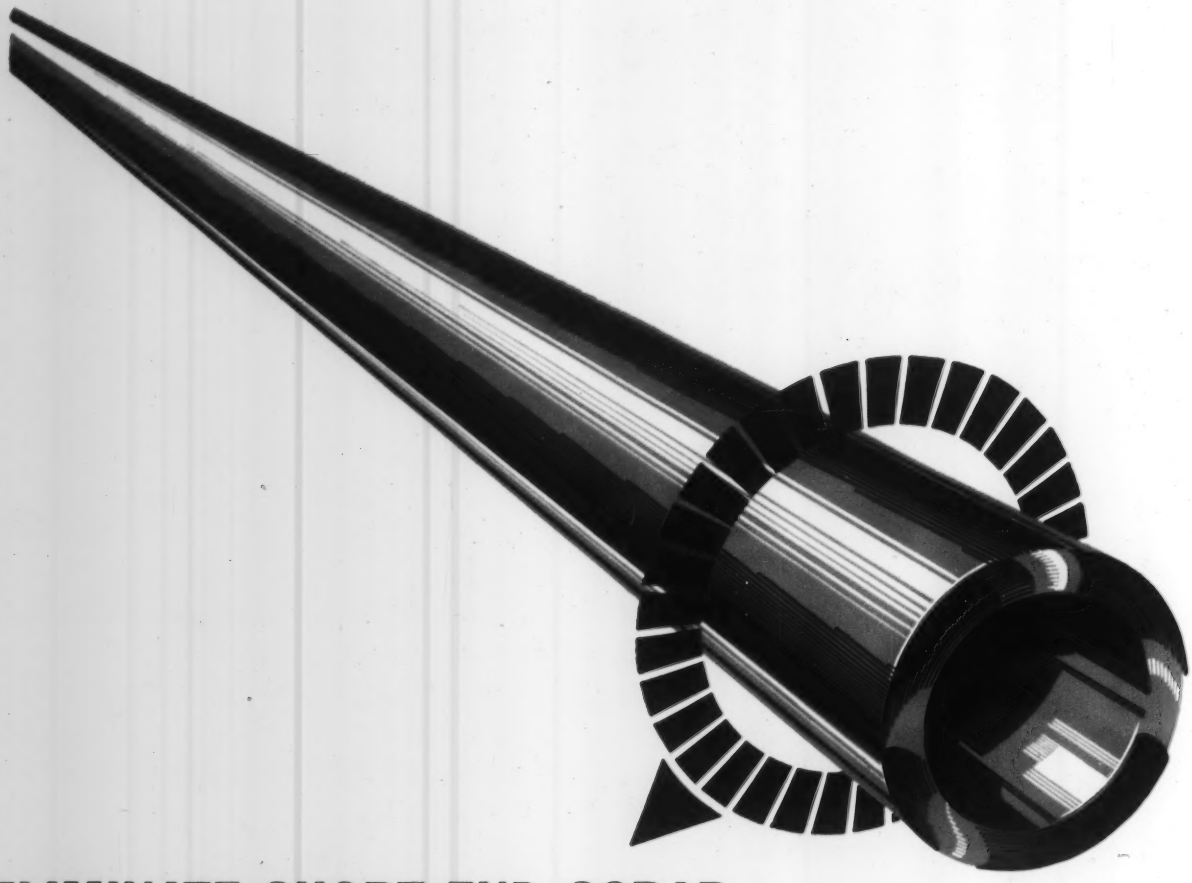
Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION



ELIMINATE SHORT-END SCRAP WITH ASARCON 773 (SAE 660) CONTINUOUS-CAST BEARING BRONZE

Asarco Continuous-Cast Bronze is available in any length you need. You are not bound by the 12-inch or 13-inch standard lengths common to other types of castings. You buy Asarcon Bronzes in exact multiples of your part length plus saw-cut. You pay only for the metal you use.

Parts made from continuous cast bronze have longer life because Asarco's Continuous-Casting process produces alloys of exceptional uniformity. Fatigue characteristics and impact strength are increased as much as 100 percent, and yield strength is up from ⅓ to more than 50% that of the same alloys produced by other casting methods.

Diameters of Asarcon Bronzes now range from ½ inch to 9 inches in any size you need. Many foundry alloys and a variety of shapes are made to order in all of these sizes. Asarcon 773 can be shipped directly from distributors' stocks or from our New Jersey and Indiana plants.

Continuous Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana

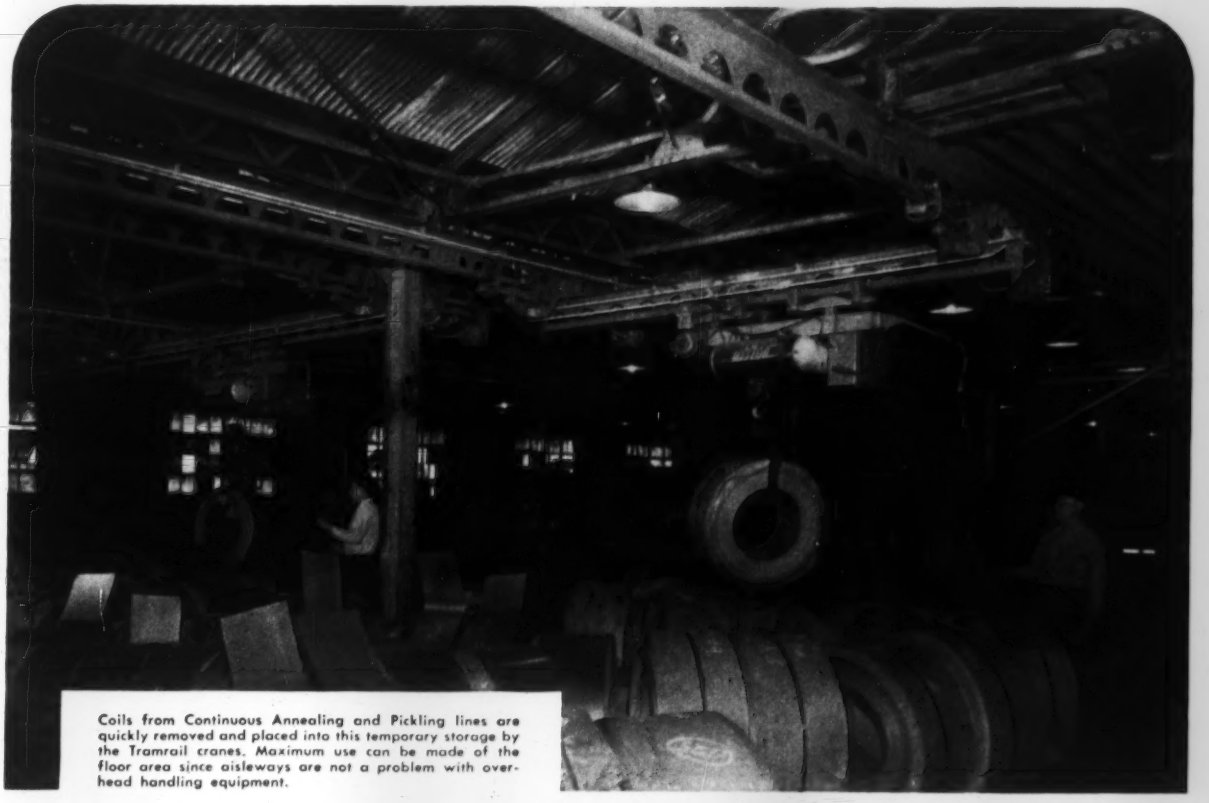
WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco

IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal

ASARCO

Tramrail Cranes BOOST Strip Production

Speed Handling—Cut "Down Time"—Aid Safety



Coils from Continuous Annealing and Pickling lines are quickly removed and placed into this temporary storage by the Tramrail cranes. Maximum use can be made of the floor area since aisleways are not a problem with overhead handling equipment.

AS a leading producer of high quality alloy strip steels, mostly of light gauge, the Superior Steel Corp., Carnegie, Pa. has secured definite production advantages and greatly improved overall plant efficiency through abundant use of Cleveland Tramrail cranes.

As the work is primarily that of rolling, annealing, pickling and handling, to obtain maximum production from their equipment, it is necessary to keep it in operation as many minutes out of the day as possible. This means that there be no delays in handling the coils of strip to and from the mills. It also means that the mill rolls must be changed in the least possible time. The Tramrail cranes have proven of great success in fulfilling these requirements and reducing "down time" to a minimum.

They have also proven to be a great aid to the workers' welfare. Being fully motorized, they have practically eliminated all manual lifting and moving. As a result, worker fatigue has been reduced and safety improved.

GET THIS BOOK!

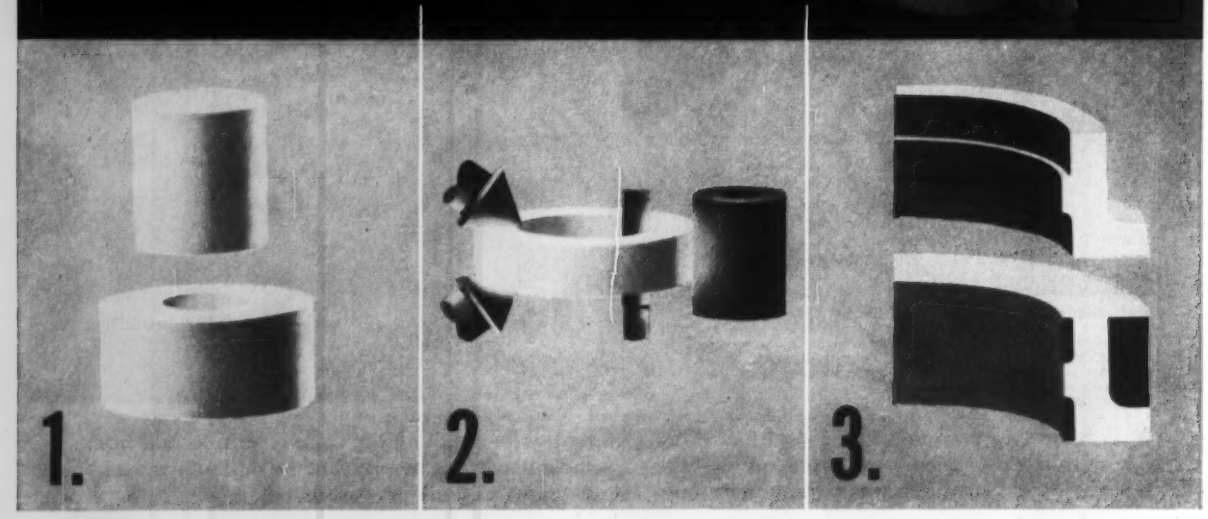
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7883 East 284th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Why users get better service from Edgewater

ROLLED STEEL RINGS



1. A solid block of steel sliced from an ingot or rolled bar and heated to forging temperature is upset and punched, forming the "blank."

2. The Ring Rolling Mill enlarges the diameter of the blank, reduces its thickness and forms the ribs, flanges, etc., as required, in one continuous operation.

3. Upper view shows accurately shaped section of typical ring, as rolled. Lower view shows material wasted if machined from plain rectangular ring.

FORGING and ROLLING give Edgewater Rings

Maximum strength and toughness with minimum weight

Edgewater Steel Company

P. O. Box 478, Pittsburgh 30, Penna.

WRITE for a 12-page bulletin detailing the Edgewater process for making weldless steel rings.

NEW CLARK CONTROL CENTERS CAN SAVE YOU ONE VERTICAL SECTION FOR EVERY FIVE!

features:

- SPACE SAVING
- SIMPLER MAINTENANCE
- GREATER VERSATILITY
- MAXIMUM SAFETY
- STRONGER and MORE RIGID

plus!

- CLARK TYPE "CY" STARTERS, OF TIME PROVEN SUPERIORITY

WRITE for your copy of this informative book containing complete information for adapting the new CLARK space-saving CONTROL CENTERS to your needs.

and each section is only 20 inches wide!

You *save space* two ways with new CLARK Control Centers—vertical sections are only 20" wide, and each vertical section can house up to 6 size 1 or 2 non-reversing combination starters. Thus 30 starters can be accommodated in 5 sections—total width only 100 inches—compared with 6 sections of ordinary 5-unit design and considerably greater width. *Maintenance* is easier because all wiring and service—even bus replacement—is from the front or top. Parts are standardized for greatest *versatility* and *flexibility*—making it simpler to adapt units to particular needs or alter arrangements after installation. For *maximum safety*, all bus is completely enclosed and empty compartments are protected by insulating barriers and closure panels. Heavy gauge steel plus exclusive design providing support for all load bearing members without dependence on shear strength of screws, assures added *strength* and *rigidity*.

The CLARK CONTROLLER *Company*

Engineered Electrical Control

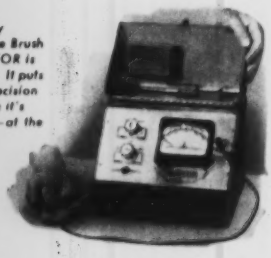
1146 East 152nd Street • • Cleveland 10, Ohio

IN CANADA: CANADIAN CONTROLLERS, LIMITED • MAIN OFFICES AND PLANT, TORONTO

It's too late to check surface finish at final inspection

Overfinishing is costly—*and final!* Detecting overfinish after a part is completed can't correct it *or* restore wasted machine time. Underfinishing is also expensive because parts must be returned for re-work. Yet, checking of finish at final inspection has been common practice. In the past, only the inspector *could* make an accurate check of surface finish—not the machine operator.

On-the-spot surface finish checking was by feel or appearance. Consequently, surfaces generally were overfinished to pass inspection—far beyond any smoothness specified. Surface finish could not be measured where it was being produced—at the machine.



Weighing only 15 pounds, the Brush SURFINDICATOR is fully portable. It puts laboratory precision to work where it's needed most—at the machine.

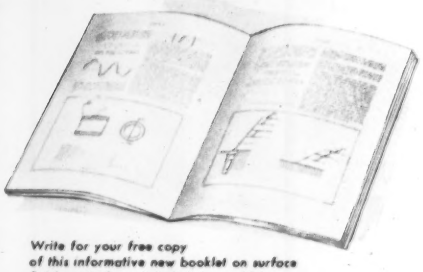
Finish now controlled at machine

Now, Brush offers a remarkable new instrument that can be used *right at the machine*, as well as in the inspection department or laboratory. The Brush SURFINDICATOR* accurately and immediately indicates the exact surface finish produced.

Simple to use

The SURFINDICATOR can be used by anyone. The hand-held stylus is simply passed over the surface in question, and an accurate measurement in micro-inches is instantly obtained. It permits the machinist to check his work *as he works*, and provides him with a guide for further finishing. Fully portable and ruggedly built, it can be used anywhere in the plant, anytime.

The Brush SURFINDICATOR provides accurate surface finish control wherever needed—on metals, glass, plastic, paper, wood and other surfaces for maximum finishing economy.



Write for your free copy of this informative new booklet on surface finish control . . . it includes new ASA standards for surface roughness, waviness and lay.

It is important that you get complete information at once on the Brush SURFINDICATOR together with the new ASA standards for measuring surface smoothness. Both are contained in the new booklet offered—write for it today! *T.M.

BRUSH ELECTRONICS COMPANY

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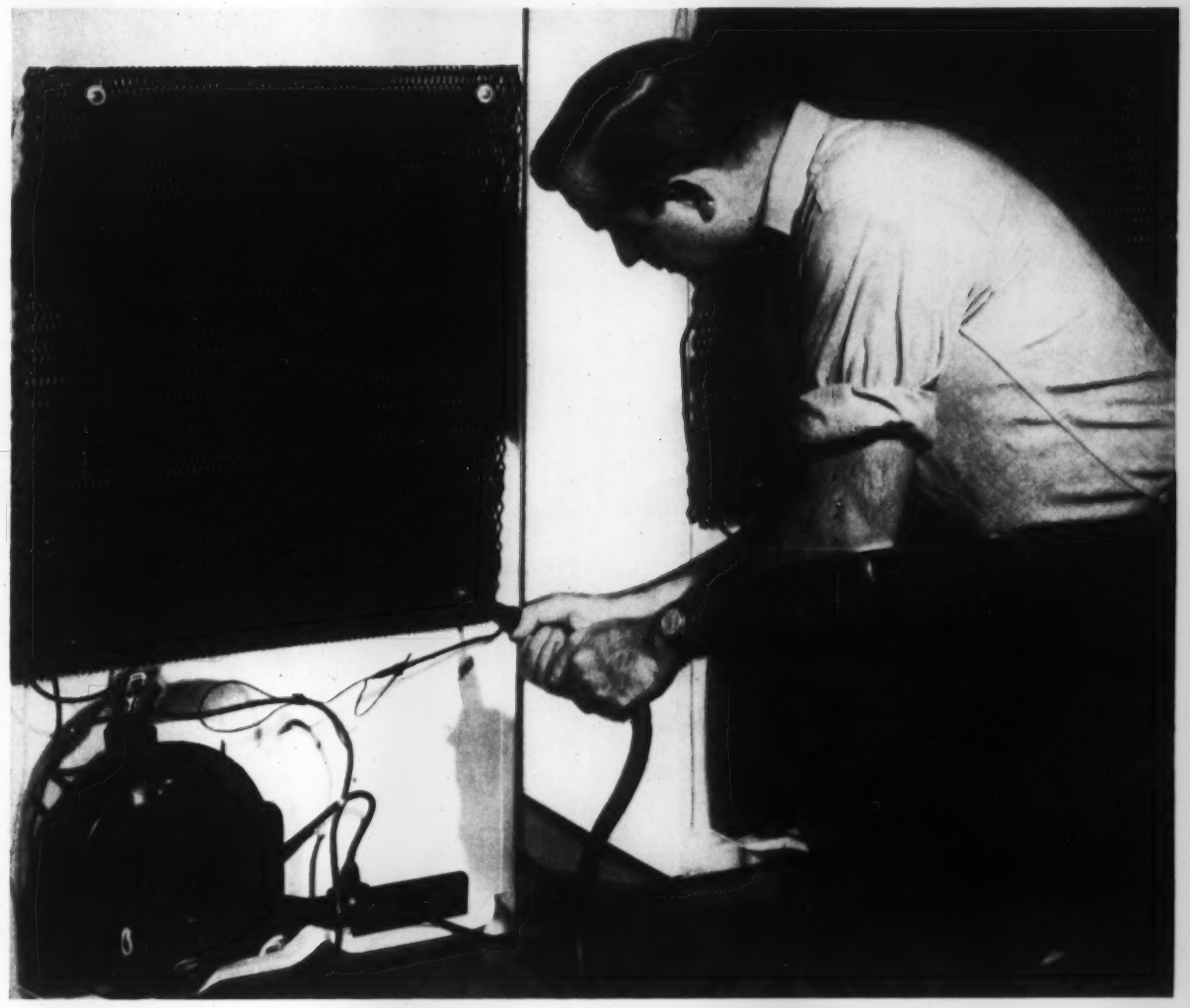
BRUSH ELECTRONICS

DIVISION OF CLEVITE CORPORATION



They may appear the same, but...

American is the name!

When you consider a source for fasteners, your real costs are based upon four factors: 1. price • 2. service • 3. quality • 4. research • You may find short-term, local price fluctuations that might seem to be worth something to you, but no-one gives you more of all four than American. • *American gives you more of all four* • *In service*, by timing deliveries and quantities to match any production schedule, from single case to freight car lots. • *In quality*, where American's quality standards are highest in the industry. • *In research* that produced not only the famous Phillips Head fasteners but has developed cold forging techniques replacing expensive cutting operations. You can use these same facilities to cut your fastening costs, too, for no-one gives you more of all four advantages — price, service, quality, research — than American. *Make your own comparisons:* send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

Thus, V.T.L. operator Joseph Walent at Crosby Steam Gage & Valve Co. summarizes his comments on their new 26" Bullard Cut Master, Model 75.

"With the movable Pendant Control I can work from the most advantageous position. You'd be surprised how much easier the Pendant Control makes it for me. It increases my production too, to have all the controls in one spot — no running back and forth from one control to another." This feature of the new line of Bullard Cut Master, Model 75 is only one of many reasons why you should have them in your plant.

Why not get the full story — ask for a catalog by calling your nearest Bullard Sales Office, Distributor or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONN.

DEPENDABLE QUALITY...

SAVINGS TOO!

Users of Metal Blast's SUPER-ANNEALSHOT live "high off the hog"! For Metal Blast guarantees the most dependable quality of any abrasive on the market. Yet, because it takes advantage of all the economies of mass production, Metal Blast prices are right in line and, in some cases, lower! So, to begin with, you pay no more, but still get the savings inherent with top quality. We'd sure appreciate a trial!

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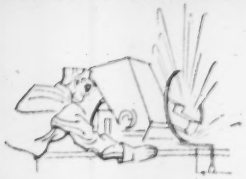
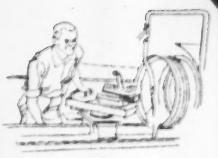
WHAT ARE AMWELD FLASH WELDED RINGS?

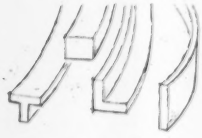
They are rings formed, flash butt-welded, and shaped into the finest quality circular weldments available.



They are rings that offer savings of critical materials. Bar stock formed and flash welded uses considerably less material than rings made by other methods.



They are rings that offer additional manufacturing savings. Since the rings are closer to the desired finished cross section, it is less expensive to machine them to a final dimension. Oh yes, Amweld will machine them for you.



They are rings made by a company with experience in design. We can help you select a mill-rolled or extruded shape that is even closer to the finished ring dimension. This can give you additional savings.

Yes, Amweld flash-welded rings can give you extra profit from savings on material and machining time. Amweld rings can be made of most weldable ferrous or non-ferrous metals in sizes from 4 to 96 inches.

AMERICAN WELDING

THE AMERICAN WELDING & MFG. CO. • 110 DIETZ ROAD, WARREN, OHIO

STEEL
November 19, 1956

Metalworking Outlook

Stable Labor Relations Ahead

Watch for reasonably stable labor relations during the second Eisenhower term. The White House's hands-off policy on labor matters has worked well. The next big contract opening doesn't come until 1958 when the auto pacts expire. New steel talks aren't scheduled until 1959. On the legislative front, don't expect any significant changes in the Taft-Hartley Act. In state legislatures, the union emphasis will be to repeal the right-to-work laws in the 17 states which have them, or to prevent their passage anywhere else. Those statutes ban the union shop and other compulsory union membership requirements. Again, forces pro and con are at a virtual standoff.

Railroads Sign Up

One sensitive labor spot, railroads, has been partly desensitized. The 11 nonoperating unions have signed a three-year pact which grants a 26.5-cent hourly wage boost over the next 36 months and bars demands for changes in most work rules. It's a good guess that a similar settlement will be made with the operating unionists.

Dues Protestors Oppose McDonald

The decision on whether the United Steelworkers' $2 boost in monthly dues will stick will be made Feb. 12 when national officers wi'l be elected; those protesting the dues have formed the National Dues Protest Committee and will have candidates to oppose President David McDonald, Vice President Howard Hague and Secretary-Treasurer I. W. Abel. If the McDonald slate wins (and odds strongly favor that it will), look for the protest to die out. A convention of the union membership to consider the issue is possible, but not probable. Some 25 per cent of the loca's would have to call for such a move.

Two More Steel Expansions

Granite City Steel Co. will start building a sintering plant next March (it'll take about a year to finish), and has already started construction of two new batteries of soaking pits (they'll be completed in about nine months). Within about two years, Granite City's ingot capacity will reach 1,584,000 tons. Pacific States Steel Corp., Ni'es, Calif., has just bought a blast furnace shell from Tennessee Products & Chemical Corp., Nashville, Tenn. The furnace has a 12-ft hearth and a capacity of more than 300 tons a day. Pacific States may also install coke ovens, in a bid to make the firm the first integrated producer in its area.

Open Hearths: Bigger and Better

Open-hearth steelmaking furnaces get bigger and better, according to a study of 29 companies by the American Iron & Steel Institute. Those firms have 204 open hearths capable of heats of more than 225 tons each, com-

Technical Outlook—p. 141 Market Outlook—p. 209

pared with only 30 such giants in 1947. In 1947, there were 39 furnaces tapping less than 100 tons per heat; now there are only five.

Expansion Plans Continue

"Inquiries to our plants indicate that steel, automotive and basic metals industries are continuing their expansion programs despite the tight money situation. Only a shortage of heavy steel products has affected their plans. Even so, there have been no rapid cutbacks except in paper, cement and fertilizer industries." So says Robert C. Becherer, president of Link-Belt Co., Chicago material handling equipment maker. Material handling equipment manufacturers report third quarter bookings were 9 per cent below those of the second quarter, but still 38 per cent higher than in the same period of 1955.

GNP: Record after Record

Watch for gross national product to hit still another record annual rate in this fourth quarter—about $415 billion. The rate in the third period was an unexpectedly high $413.8 billion. Big increases in plant and equipment outlays, government spending and personal consumption of nondurables and services offset any losses caused by the steel strike.

New Appliances Coming

If new product development is as rapid in the next ten years as it has been in the past decade, expect 50 per cent of appliance sales in 1966 to come from products not yet on the market. Some 60 per cent of this year's volume comes from products introduced since World War II, says S. J. Stephenson, manager of Westinghouse Electric Corp.'s portable appliance division.

Paradox in Construction

Some firms making building products find business in a momentary lull despite record activity in the field. Discounting the seasonal slack beginning now, some companies find the shortage of heavy steel has caused contractors to delay deliveries of products easier to get. Republic Steel Corp.'s Truscon Steel Division in Youngstown, for example, has been forced to lay off 200 to 300 because many customers have delayed deliveries of joists, decks and other building products.

Straws in the Wind

The Masters, Mates & Pilots and Marine Engineers Beneficial Association are picketing American Coal Shipping Inc., new coal carrier backed by United Mine Workers and others; the company had already signed up with UMW's catch-all District 50 . . . A new price policy will result in reductions on many Westinghouse power transformers . . . On Nov. 6, voters approved bond issues totaling $2.3 billion . . . The Canadian government is exploring the possibility of developing a west coast smelter to feed pig iron and ingots to Japanese steel mills.

If you machine parts like these...

we can save you UP TO 30%

...with Ryerson leaded steels

If you machine carbon or alloy steels for production or maintenance applications—you should be able to make substantial savings by switching from a standard steel to a Ryerson *leaded* steel.

We can tell you about customers who produce up to 50% more parts per machine hour, now that they have changed over to a leaded steel recommended by Ryerson. Others report tool life lengthened as much as 300% . . . rejects reduced to all-time lows . . . machine down-time slashed . . . finishing processes eliminated.

The nation's largest stocks of leaded steels in a wide range of types and sizes are ready for quick shipment from Ryerson. (See listing below.) Each is the fastest machining steel of its type available anywhere. If you are not now using leaded steels, it will be worth your while to investigate the possibility of adapting one of them, or several, to your operations.

A Ryerson representative will be glad to work with you. Show you dozens of case histories—good hard facts that document just how well Ryerson leaded steels have worked out under actual shop operating conditions. Call your nearby Ryerson plant.

LEADED STEELS IN STOCK

CARBON STEEL BARS

Ledloy (Screw Steel) . . . Cold drawn rounds, squares, hexagons.

Rycase (Case Hardening, Low Carbon, Manganese) . . . Cold finished rounds.

ALLOY STEEL BARS

Rycut 20 (Low Carbon, Case Hardening) . . . Hot rolled and cold finished rounds.

Rycut 40 (Medium Carbon) . . . Hot rolled and cold finished rounds, annealed to heat treated and stress relieved.

Rycut 47 (Medium Carbon) . . . Hot rolled, annealed rounds.

New Rycut 50 (Medium Carbon) . . . Hot rolled and cold finished rounds in annealed condition, hot rolled rounds heat treated and stress relieved.

Leaded 8620 . . . Rounds hot rolled, cold finished.

Leaded 4140 . . . Rounds, cold finished, annealed or heat treated and stress relieved.

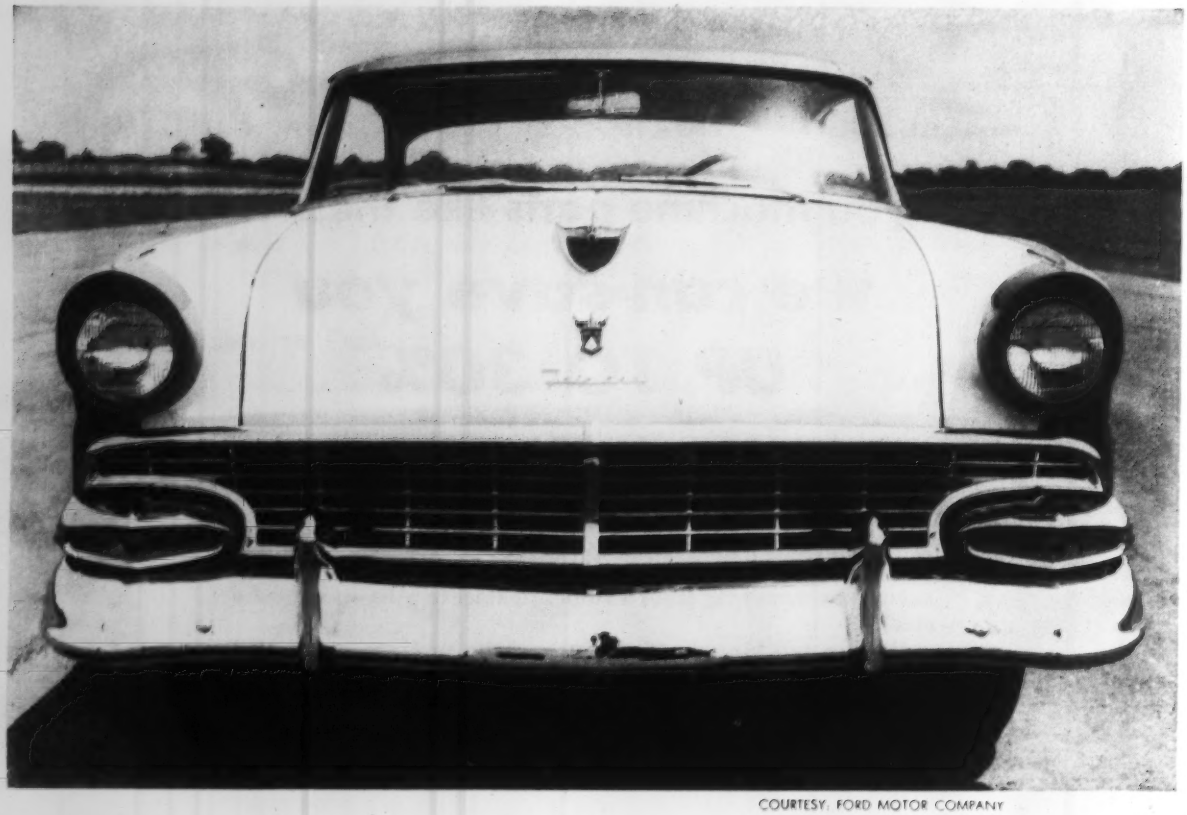
Leaded 8647 . . . Rounds, hot rolled, annealed.

CARBON STEEL PLATES

New E-Z Cut Plates (Hot rolled, low carbon, manganese.)

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



COURTESY, FORD MOTOR COMPANY

DSC STRIP Scored 100% Job-Performance on '56 Ford Radiator Grille Production

THE FACTS

Here is the front end of a 1956 Ford Fairlane model. Notice the chrome plated radiator grille. This consists of two matching concave units, right and left, joined in the middle. Each unit is a one-piece stamping incorporating frame and latticed grid. The grid section is of continuous-drawn channel design.

DSC STRIP was used by two Ford vendors to make this part during the '56 model year. It wouldn't be "cricket" to divulge the tonnage shipped these customers from September '55 through August '56. It was substantial. The blanks average close to 6 pounds a piece.

The big point, though, is this: Our Detroit Mill batting average on total shipments was "1000" . . . not a single pound was rejected.

THE "SPECS"

GAUGE . . . . . (standard tolerance) . . . . . .036"

WIDTHS . . No. 3 Edge . . ranging from 14" to $23^{15}/_{16}$"
(depending on blanking method)

TEMPER . . . . . No. 4 Soft

FINISH . . . . . DSC No. 2 Bright
(suitable for chrome plating)

There's nothing unusual here . . . except that the temper was "custom tailored" to suit the drawing and forming intricacies of the grille; the finish had to meet the requirements of mass-production chrome plating.

Another example of DSC stripmanship at work . . . where the PROOF of the STEEL is in its PERFORMANCE.

Customer Satisfaction Is Our Business

Ask a DSC Customer "Rep" to tell you more about DSC STEELMANSHIP

DSC MILL PRODUCTS, PORTSMOUTH DIVISION, PORTSMOUTH, O.

Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

DETROIT MILL DIVISION, DETROIT, MICH.
EASTERN MILL DIVISION, HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

DETROIT DSC STEEL

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DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

Ingredients for Success

So many of the ingredients for personal success crop out in Clarence B. Randall's delightful new book, *Over My Shoulder*, that we would be remiss if we failed to recount some of them.

The retired (Apr. 1, 1956) chairman of Inland Steel Co. was privileged to grow up in Beaver Valley, a village in New York.

He has since marveled that friends who were born in big cities have done so well. As he says, they have never gone barefoot all day, or caught frogs in a swamp, or trapped muskrats, or knocked chestnuts from a tree with one eye on the farmer's barn.

Clarence was blessed with a strong-minded mother who persuaded his father to give up his store in Beaver Valley, move to Kingston, Pa., and take a job as salesman. Mrs. Randall wanted young Clarence to attend Wyoming Seminary at nearby Wilkes-Barre.

Clarence had determination, too. At Harvard (the family moved to Cambridge, and father became a coal salesman) 105-pound Randall was too light for athletics, so he went out for debating. At the tryouts, his mind went blank while he was giving a memorized speech. He felt that he was a failure. But he went on to become one of the most articulate speakers of our day. When President Truman seized the steel industry in 1952, Mr. Randall was called on to present its case to the nation over radio and television.

In contributing to the family earnings during his school years, he tried his hand at selling from door to door, wrapped packages and waited on tables. He became acquainted with great literature while working at the Harvard co-op.

As a budding attorney in the Michigan iron ore country, Inland Steel asked him to become manager of its ore mines. Today, in his busy days of retirement, he still has time to reflect on some of tomorrow's problems. He says in his book:

"When I see the child of today lying prone on the floor in front of the television set for hours on end, chin in hand, receiving countless impressions, but creating few ideas for himself, I sometimes wonder whether society will some day revolt against our technology and try synthetically by organized effort to recapture the values that pervaded my boyhood and of which I was totally unaware."

In this advancing age of electronics and the atom, the ingredients for success of the individual and the welfare of our nation set forth by Mr. Randall cannot be overlooked.

Irwin H. Such
EDITOR-IN-CHIEF

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN

here's the way to BOOST PLANT CAPACITY on a limited budget

In thousands of plants, all over the country, engineers and maintenance men are making their equipment more automatic and more productive by installing MICRO SWITCH precision switches. These switches are famous for their space-saving size, dependability, rugged housings and easy installation.

Plant production is increased at the very minimum of cost. As machines are made more automatic, operators do more and better work. Work is done more quickly under the safer conditions that protective switches provide. MICRO SWITCH interlocks save costly machines, dies and materials from damage.

This multiplication of plant work capacity through the use of MICRO SWITCH precision switches is easily done. Products of MICRO SWITCH, a division of Honeywell, are readily available. They are sold by authorized distributors in key cities everywhere.

Why not put new life into your present plant equipment? Look under "Switches, Electric" in the Yellow Pages for the name of the distributor near you. For technical assistance on switch problems, call MICRO SWITCH Engineering Service at the nearest branch office.

HOW MUCH IS A NEW PRODUCTION IDEA WORTH? MICRO TIPS DIGEST IS FULL OF THEM—WRITE TODAY

Problem—*To shut off motor when oil supply is low.*

Solution—Two HONEYWELL Mercury switches were attached to float in oil reservoir. When re-filling is needed first switch lights a warning light. If level becomes dangerously low, second switch shuts off motor.

Problem—*to stop needle breakage in knitting machine.*

Solution—Two metal-enclosed MICRO SWITCH precision switches were installed at upper and lower limits of knitting machine. They shut off current if thread breaks either above or below the cone.

Problem—*to avoid broken band saw blades because of improper tension.*

Solution—A MICRO SWITCH metal-enclosed switch is located on sliding sleeve at upper band saw wheel. When sleeve, which indicates tension, travels beyond danger point, switch turns on warning light.

Any of these catalogs will be sent on request

62 "Basic Switches" • 65 "Micro Switch Trip Control"
73 "Toggle Switches" • 74 "V3 Switches"
75 "Subminiature Switches" • 83 "Industrial Enclosed Switches"
90 "Mercury Switches" • 101 "Switches for Industry"

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

Cost-of-Living Index for Machines?

One way to help yourself out of the depreciation maze is to recognize the changing value of the dollar—particularly to figure the yearly cost of depreciation which changes with inflation just as the cost of raw materials or labor does.

Self-Help on Depreciation

Industry can draw a more realistic profits picture by: 1. More use of modern accounting methods. 2. More use of indexes to allow for inflation in the cost of depreciation

WHEN IT COMES to depreciation, most management men, accountants and government officials are caught in a maze.

Some hardly realize the predicament—we've been in it so long that it seems normal. Others know the dangers, but don't know how to get out. If we are aware of the problem and have the wit and courage to find our way out, we'll go far toward solving a major business problem—a shortage of capital.

Industry can do a lot to reform its own practices. It can take more notice of inflation. It can reform other accounting and related procedures. Result: It can do a better job of running its business on a realistic depreciation basis.

Crux — Inflation and a faulty government depreciation policy which began in 1934 have combined to cause industry to overstate its profits because it has been understating part of its business expense, depreciation. When facilities for doing business wear out or become obsolete, that's just as much a cost as raw materials or labor. No accountant in his right mind would list the expense of a ton of steel as $100 when he knew his company paid $150 for it. Yet many an accountant has had to list the year's depreciation expense of some machine as $100 when he knew his company's actual depreciation cost was $150.

As a net result of such practices, industry overstates its profits to the tune of $4 billion to $5 billion a year, estimates the Machinery & Allied Products Institute. And it pays taxes and dividends on that paper profit. It's an erosion of capital. Since 1934, at least $60 billion (in terms of 1956 dollars) has gone down the drain this way. That money could have gone for modernization of plant and equipment. Inadequate though they be, our depreciation allowances account for well over half the fixed capital expenditures of American industry.

Cause—Tax depreciation matters started to get out of joint in 1931. That year, the Internal Revenue Service (then called the Bureau of Internal Revenue) compiled a list of useful lives which showed how long industry was using its physical assets. It was reasonably accurate, but remember that World War I had forced industry to use equipment as long as possible and that the 1920s were not noted for great technological advances which would speed equipment modernization.

Bulletin F didn't create a stir in 1931 because the laissez faire practice of the 1920s—when industry could write off its assets at pretty much its own option—was still in vogue. In 1934, the Roosevelt administration needed more money, yet didn't dare raise taxes. Somebody pointed out that industry was claiming far more depreciation than would appear justified by the Bulletin F schedule of useful lives. Out came a new ruling (Treasury Decision 4422) which for the first time put the burden on industry to prove that its schedules of useful lives were justified. If a company couldn't prove its rates (and few could in those days

of sketchy records), Bulletin F was the gospel. The average life it allowed was (and still is) 20 years. Depreciation allowances went down, profits—and taxes on them—went up.

Improvement — What was intended as a tax-boosting expedient to last only a few years has become frozen into our tax system. The Internal Revenue Code of 1954 reforms some provisions (going a short step in the right direction), but we need a giant leap.

The main advance in the 1954 code is the permission to use the double-declining-balance or sum-of-the-digits method of depreciating in lieu of the straight-line technique formerly required in almost all cases. On the straight-line basis, the same depreciation must be charged whether the machine is 1 or 19 years old, despite the widely recognized fact that assets depreciate more in their early years than in their later ones. The new methods permit faster write-offs in the early years of an asset. MAPI calculates that the new methods permit gains of 10 to 15 per cent in the after-tax rate of return on the investment in medium-lived assets. Yet, only 60 to 70 per cent of metalworking has switched methods for tax purposes. (Most of them went to the sum-of-the-digits method.)

Bookwork—IRS has inaugurated administrative reforms, too. The most notable is de-emphasis of the archaic Bulletin F. It still governs when a company is new or can't prove its claims. But most companies are being allowed shorter lives on assets than those specified in the bulletin. Chances are that it will be re-emphasized when a current project to modernize it is finished. Two phases of the program will: 1. List new equipment developed since 1942 when Bulletin F was last revised. 2. Evaluate the old estimates to bring them into line with current experience. The first part may be completed sometime late next year, but nobody knows how long the second part will take to finish.

Current government (and industry) practices still cause industry to overstate its profits because:

1. Inflation is largely ignored. The U.S. permits no re-evaluation of assets for tax purposes according to a price index, although it is permitted in France and Japan. All tax depreciation must be on the basis of the original cost.

2. Some 99 per cent of all industrial assets must still be depreciated for tax purposes under archaic methods. The Internal Revenue Code reforms apply only to new facilities or equipment acquired since Jan. 1, 1954. Only about 1 per cent of our assets date from that time.

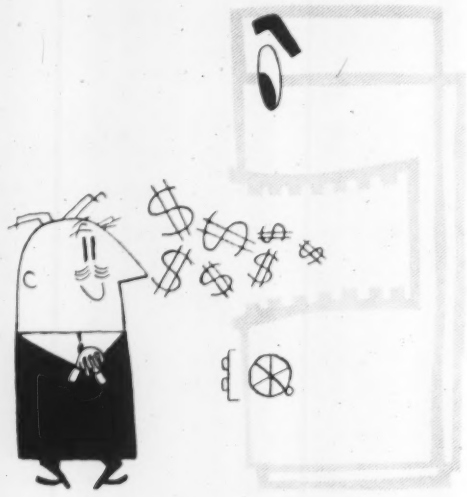
3. The U.S. continues to make it tough to claim unusual obsolescence and get more rapid write-offs than normal. The company must predict in advance that extraordinary obsolescence will be coming because of technological improvement, a difficult thing to do.

More Reform?—The revised Bulletin F may take into account our rapid technical progress, but the hope is dim for much additional, substantial and prompt depreciation reform by the government unless industry adopts common practices that eventually can be accepted in Washington.

Inflation—Although the government won't allow adjustments for inflation for tax purposes, there's nothing to prevent a company doing it for its own purposes.

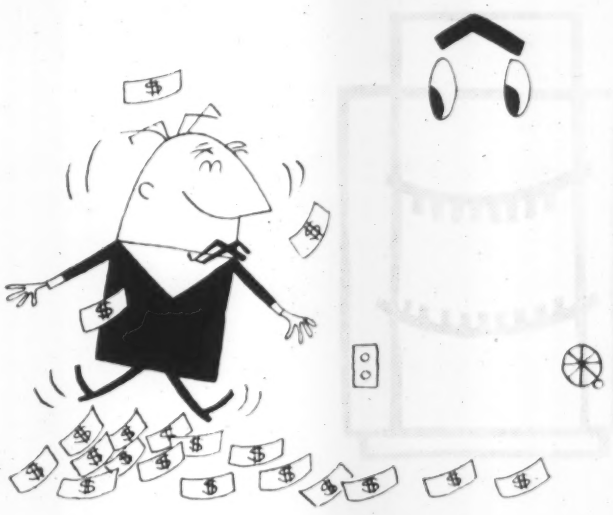
How?

Benjamin F. Fairless, president of the American Iron & Steel Institute, suggests that each industry or company determine how much its costs rise yearly to rebuild and re-equip. Then, you should determine the average life of your assets (which need not be the same as that claimed for tax purposes). With those facts, it's mathematically routine to determine the factor by which the historical dollar must be multiplied to recover constant purchasing power. For example:



Boost Equipment Investment Return 10 Per Cent?

You can get still further out of the maze if you use modern depreciation accounting methods. The U.S. now permits two new techniques which can boost the rate of return on equipment investment by 10 to 15 per cent. Yet, at least 40 per cent of metalworking does not take advantage of those opportunities.



Realistic Profits: The Road Out

Only when industry shows a common practice of taking inflation into account in its own accounting, will the government accept it for tax purposes. When that day comes and when most of industry uses the modern depreciation methods, we at last will be well out of the depreciation maze and on the road to realistic profits and better business management.

Rate of Inflation	Multiplying factor, life of: 5 years	10 years	25 years
5%	1.16	1.30	1.77
6%	1.19	1.36	1.96
7%	1.22	1.42	2.15
8%	1.25	1.49	2.34

The steel industry figures its rate of inflation is 7 per cent, and its facilities last 25 years. To keep its asset value current, its multiplying factor is 2.15.

But how are you going to find the rate of inflation for your own company? **H. T. McAnly, resident partner with Ernst & Ernst, Cleveland accounting firm, suggests that the wholesale price index would be accurate enough if you can find no more precise figure.**

He deplores the haggling in the accounting profession over the matter of accurate indexes. "Because the profession has failed to come up with a device to take inflation into account," explains Mr. McAnly, "there's no common practice in industry to adjust for price rises. Partly because there's no established practice, Congress hasn't accepted any adjusting devices to figure tax depreciation."

Other Reforms—Ernst & Ernst's George J. Grabner points out that other accounting reforms would help long-term depreciation policies, too. About one-third of metalworking doesn't use new depreciation methods for tax purposes, **although MAPI studies show they bring substantial savings. Says MAPI: "No management can properly be indifferent to an improvement of 10 per cent or better in its after-tax return from depreciable assets, especially an improvement obtainable with so little effort and expense."**

Why are so many metalworking firms indifferent to the improvement? One reason is that some managements fear their stockholders would object to the lower profits that the new accounting methods would show in the earlier years of the switch. Others don't want to be bothered with a separate accounting procedure for just those assets acquired since Jan. 1, 1954.

Many companies also probably don't realize the advantages. National Automatic Tool Co. Inc., Richmond, Ind., is running an unusual series of ads prepared by Alexander Stolley and the Cincinnati agency, Farson, Huff & Northlich Inc., which publicize the advantages (some of the ideas in them appear in accompanying exhibits). Harris-Seybold Co., Cleveland printing equipment manufacturer, is one of a growing number of firms that uses the new depreciation methods as a selling tool. Its salesmen have cards which compare depreciation methods. For example, on an asset that cost $10,000 and had a 15-year life, the figures compare this way:

Yr	Straight-Line Dep Charge	Straight-Line Year-end Accum Dep	Sum-of-Digits Dep Charge	Sum-of-Digits Year-end Accum Dep
1	$ 667	$ 667	$ 1,250	$1,250
2	666	1,333	1,167	2,417
3	667	2,000	1,083	3,500
4	667	2,667	1,000	4,500
5	666	3,333	917	5,417
6	667	4,000	833	6,250
7	667	4,667	750	7,000
8	666	5,333	667	7,667
9	677	6,000	583	8,250
10	667	6,667	500	8,750
11	666	7,333	417	9,167
12	667	8,000	333	9,500
13	667	8,667	250	9,750
14	666	9,333	167	9,917
15	667	10,000	83	10,000
Totals	$10,000		$10,000	

Result — Companies like Natco and Harris-Seybold believe that when you teach realistic depreciation you sell more equipment. Firms that have learned the lesson discover that they know what their real profits are. That enables them to price their products better, pay more realistic dividends and keep their facilities up to date so their company is a better long-term investment for their stockholders.

Those companies are finding their way out of the depreciation maze

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Photographs by Fred M. Hauserman

Inconsistency is everywhere in Russian industry. At left is a clean, efficient looking bearing line being tested in a Kiev machine tool plant. The picture at right was taken in the same area of the same plant

"Don't Sell Russia Short"

That's the advice of a group of American businessmen who toured Russian industry. Inefficiency and inconsistency stand out, but if priority is high enough, Reds will get it done

RUSSIA'S civilian industry looks like ours did in 1938. Electrically, the USSR resembles the U.S. in the early 1920s. But don't pooh-pooh Russia's ability to get things done. If she sets her priority high enough on any project, she'll get it done, no matter how inefficient she may seem by American standards.

Those are just a few of the impressions brought back by a group of American industrialists who spent eight days last month inspecting Russian industry—from candy factories to machine tool plants. George S. Case Jr., president of Lamson & Sessions Co., Cleveland, says: "I was impressed with the caliber of the directors, foremen and most of the people in supervisory jobs. But there seems to be a frantic shortage of engineers in everything but atomic and defense work."

What's an Engineer? — He explains that many of the touring Americans came away with the impression that "many of Russia's engineers are nothing more than trained technicians or what we would call journeymen . . . not engineers in our sense of the word." But wherever the group went, they saw people reading and studying. "There is a great emphasis on education in Russia today," observes Wade N. Harris, president of Midland Steel Products Co., Cleveland. "Especially technical and scientific literature. But the Russians have a lot of ground to make up in that respect," he believes.

The group visited metalworking plants in Moscow, Kiev and Kharkov with side trips to Leningrad. They inspected a large tractor factory, a bearing plant, a power generator plant, a machine tool factory and many construction sites. Everywhere they saw foreign machinery of the lend-lease vintage or "liberated" German equipment, most of which was in good operating condition. "The generating plant had as good equipment as you will find anywhere, but the whole thing was terribly imbalanced," says Mr. Case. "Many places we saw plants, apartments and projects that had been started, but few were finished."

Inefficiency — The tractor plant was laid out well, but with a minimum of automation. Parts were conveyed on overhead belts much as they are in the U.S., but scheduling was poor, resulting in frequent jam-ups on the line. "I don't know much about tractor plants," Mr. Case states, "but I'm sure any of our men could have gone in there and within a year cut labor costs by 20 per cent."

Russia is progressing in automation, but it has a long way to

go. The bearing plant was laid out comparable to any in the U.S., the industrialists report, but it didn't run with our customary smoothness. "There is no question about the troubles they are having in presenting their present work force with automation," declares Fred M. Hauserman, president, E. F. Hauserman Co., Cleveland. "But they are training for it much better than we are in many cases."

A La Warner & Swasey—In the machine tool plant, the Russians were making turret lathes which resemble standard Warner & Swasey machines of a few years back, the group says. At Moscow's Agricultural Fair, a sort of "perpetual world fair" for tourists, they saw some excellent Russian designed and built machine tools. "However, we didn't see many of those in the plants."

One thing that impressed the group was the inconsistency all around them. In construction, especially, the magnificent Moscow subway contrasted with practically new apartment buildings which were literally crumbling away before they were even occupied. This same inconsistency was evident in Russia's industry, as the pictures on page 102 show.

Eyestrain—Lighting was poor almost everywhere, even in inspection areas in the factories. In a new Moscow apartment building, there was only one convenience outlet for each apartment and wiring was plastered to the walls.

"If what we saw was average, it doesn't come up to the average in the U.S.," declares Mr. Hauserman. "But don't underestimate the Russians. As a potential enemy, they're dangerous. As a competitor in world markets, they would be no problem if they played by Western rules, but they don't. They price a product on the basis of the goal to be achieved, hang the cost."

"Fortunately," Mr. Case observes, "Russia doesn't have much outside of furs, lumber and a few ores which the rest of the world wants. So, for the time being, there is no problem."

Strapping Sales Up

Industry sees two records ahead: One this year and another next year

ADVANCES in packaging methods and automation are boosting the expansion pace of the steel strapping industry. Sales are increasing at a rate slightly faster than the expansion of the nation's economy.

The industry sees more business ahead in 1957—about 20 per cent better than it is expected to be this year, say some makers.

About 15 companies are in the business. Most of the strapping is low-carbon flat strip or round wire.

Uses—The steel industry is the biggest user, followed by nonferrous metals, automotive, agricultural implements, heavy machinery, lumber, paper, chemicals, textiles and food.

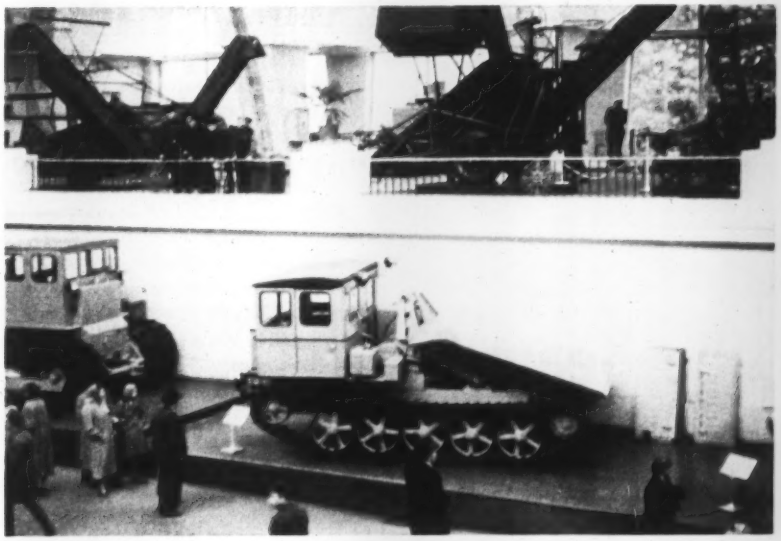
Most of the industry's growth comes from increases in applications, rather than new uses. The high price of labor and raw materials gives additional incentive to protect goods in handling and shipment.

What's New—Among recent applications is the bundling of creosoted fence posts. Another is an improved method of packaging brick without using a pallet. Openings for lift truck forks are left in the stack.

On the West Coast, strapping is being used to hold two semicircular wooden forms for a concrete bridge pier. Eight 1¼-in. flat steel bands were used to hold forms 8 ft high in place. The bands were able to withstand the circumferential pressure exerted by wet concrete in a pier 12 ft in diameter.

Machines—Use of power machines for strapping is gaining rapidly. A good portion of them are standard units, but there is a growing tendency to use complicated special equipment. They are installed in production lines and the work is brought to them.

Hand operated strapping tools are usually sold to the customer, but power equipment is generally leased.



This "farm tractor" is on display at Moscow's Agricultural Fair. It resembles a small weapons' carrier. Few machines of this quality are seen outside of the fair, which is part of the propaganda program

ODM Amortizes Taxes

A fast write-off of taxes on facilities worth over $31 million was certified by the Office of Defense Mobilization in the two-week period ended Oct. 31.

The largest write-off (on $9,276,000) went to International Business Machines Corp., Owego, N. Y., for guided missile systems. United Aircraft Corp., East Hartford, Conn., received fast amortization on $6,378,000 worth of facilities to produce military aircraft engines.

National Research Corp.: New Enterprises Through Research

"During the course of our investigations of reduction methods, vacuum melting techniques, purifying and coating processes, we have worked with two-thirds of the 80 or more metallic elements in the periodic chart."—Richard S. Morse, president

Commercial Development Department

- Technical and economic surveys
- Market surveys
- Industry analysis

Research Division

- Titanium castings
- Zirconium castings
- Metal coatings
- Oxidation resistant coatings for molybdenum
- Corrosion resistant coatings for steel
- Metallurgical equipment development
- Refractory metal scrap recovery

NRC Equipment Corp. (subsidiary)

- Vacuum melting furnaces
- Vacuum heat treating furnaces
- Vacuum analytical apparatus

Steels	Aircraft
Nuclear metals	Reactors
Copper	Electronics
Nickel base	Electrical
Titanium	Chemical
Zirconium	Machine tools
	General metalworking

NRC Metals Corp. (subsidiary)

Zirconium reactor grade	Reactor parts
Zirconium commercial grade	Nuclear fuel
Zirconium chemicals	Fuel element containers
Hafnium	Control components
Thorium	Chemical process components
Rare earths	Corrosion resistant applications

NRC Stays On the Beam

THE WORLD doesn't beat a path to your door for that better mousetrap, says National Research Corp., Cambridge, Mass. It is putting increasing emphasis on the commercialization of results stemming from its research activities.

The firm should know. Last year, it spent $2.5 million (more than one-third of its revenues) on research. Many research-minded industrial giants can't match that sum.

Sources — NRC gains revenue from three sources: Contract research, royalties and licenses and sales of products and services. This year, sales revenue is 70 per cent above 1955's; revenue from licenses is also heavier. Contract research revenue is down.

Commenting on his firm's changing goals, President Richard S. Morse notes: "You can't go on forever on just glamour; from now on I've got to start making money and considering dividends." Company assets have grown from the $50,000 in venture capital Mr. Morse put into it in 1940 to $6 million.

Pioneer—NRC has scored technological triumphs in metals and metal processing, chemicals, petrochemicals, electronics, nuclear power, fissionable materials, jet engines and food processing. To NRC goes major credit for the development of vacuum melting of metals and alloys on a commercial basis.

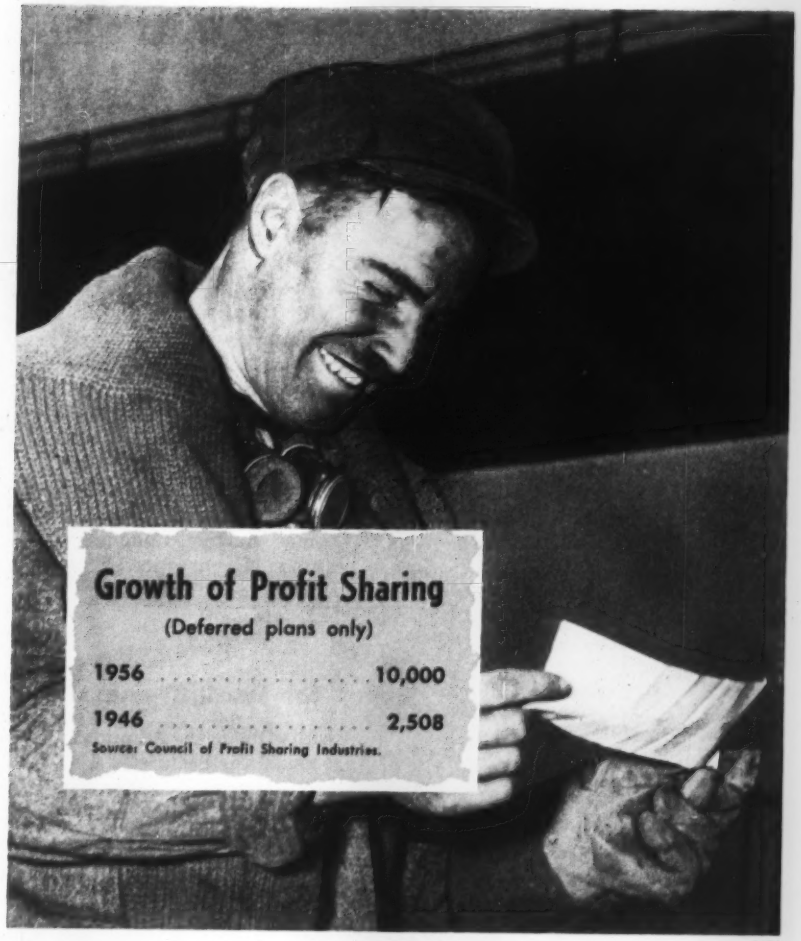
Sales of vacuum furnaces to industry have doubled since 1950. A new trend: Sales inquiries from consumers rather than producers of metal are increasing. Many consumers are using vacuum furnaces to develop new materials, says NRC.

Outlook—Other developments of the not too distant future: A further refinement in vacuum melting steels and alloys for antifriction bearings and electronic parts.

For nuclear power: Metals of higher purity than ever before produced for fissionable application and structural materials. For corrosion resistance, heat and light reflection and decoration: Continuous coating of paper and plastics with metals.

With half of its 500 employees in research, engineering and market development, NRC should continue to pioneer in those and other fields, promises Mr. Morse.

Longevity — NRC has a notably low turnover among its scientists and engineers. Significant personnel policies: 1. Top level integration of scientists with the business executives. 2. Key men all have potential replacements within the organization. The chief incentive to personnel is a challenging research environment and unusual opportunities for advancement to management positions.



NEA

Profit Sharing Moves In

Corridor talk at a Cleveland conference of the Council of Profit Sharing Industries: P-S can meet union demands for SUB; two major steelmakers may start plans

JUST BEFORE negotiations between major steelmakers and United Steelworkers of America got under way this summer, the union spent $29.50 for a set of reference works on profit sharing.

You can interpret that information two ways: 1. As the tip-off to labor's (especially Dave McDonald's) changing attitude toward profit sharing. 2. As an indication that the union expected some steel firms to propose profit sharing in lieu of Supplemental Unemployment Benefits.

Rumor — So far as is known, nothing was said about profit sharing during the negotiations. But the rumor persists that two major steelmakers are seriously considering it.

Why this upsurge of interest in profit sharing? More metalworking companies are finding it pays off in increased efficiency and production (STEEL, Feb. 28, 1955, p. 58); some elements of organized labor are feeling kinder toward it.

At least four metalworking firms, says the Council of Profit Sharing Industries, Chicago, report successful integration of SUB and profit sharing: Bell & Gossett Co., Morton Grove, Ill., Commercial Steel Treating Corp., Detroit, Kwikset Locks Inc., Anaheim, Calif., and Resistoflex Corp., Roseland, N. J.

SUB and P-S — One stumbling block has been Internal Revenue Service's ruling that profit sharing cannot be used as a means of getting around SUB. But new regulations published on Sept. 25 provide that distributions from profit sharing funds may be made during periods of temporary layoffs, says Isidore Goodman, assistant chief, Pension & Exempt Organizations Branch, IRS. This provision operates so long as IRS is convinced that the plan is a true profit sharing program.

Commercial Steel Treating showed IRS that it had only $500 in its fund which came from what may be termed SUB sources, compared with $800,000 from profit sharing.

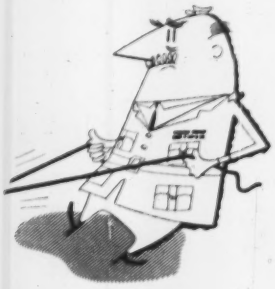
The $500 figures in because Commercial Steel Treating follows Ford-type SUB for employees with less than three years' service: It deposits 5 cents per hour per man for them.

Background—The idea of using a profit sharing trust fund for wage guarantees is not new (STEEL, Mar. 19, p. 44). Now some long established funds can be changed to include special loan or withdrawal provisions, and new plans "may no doubt be started with the prime purpose of meeting this employees' demand," says J. J. Jehring, director, Profit Sharing Research Foundation, Evanston, Ill.

Attitudes — President Lucas S. Miel of Commercial Steel Treating believes the big auto companies will eventually come to profit sharing "as will most other industries." He predicts that the unions will seek it faster than management may want to give it.

In light of Mr. McDonald's recent statements to the effect that steelworkers want to share in the profits, it will be interesting to watch for developments from Walter Reuther's office (he's still on record against profit sharing). Key to the movement: Union locals in many industries are said to favor it. How long will the internationals withstand the pressure?

DOD Urges Tighter Reins on Civilian Nickel Use



SEVERAL indications point to increasing defense uses of nickel. Latest is an appeal from Defense Secretary Charles E. Wilson asking industry to look for places to save nickel in civilian equipment by the "fullest use" of substitute materials. The secretary has been an enthusiastic backer of such conservation measures within the Defense department. And on occasion, he has asked industry to observe conservation measures, but this statement—in which he refers specifically to this metal—apparently is unprecedented and points up the importance attached to nickel supply by defense planners (see page 232). It also could be an added warning to civilian users: In spite of increasing supplies of the metal, they better be prepared to live as they do now—with tightened belts.

More Nickel Coming

There is little doubt that more nickel sources are coming in—the Office of Defense Mobilization's timetable (440 million lb per year by 1961) presumably is on schedule. (Just last week ODM turned down a proposal to finance a nickel project by a direct government loan; feeling was that present incentives—fast tax write-offs and government purchase contracts—are enough.) Only recently the Defense department ended its quota system which controlled the amount of nickel that could go into a jet engine, but designers got a veiled warning not to go overboard in its use.

Answer on Nickel: 202 Stainless

With defense needs threatening to rise one-third, what will industry do for nickel? The Defense department thinks part of the answer lies in 200-series stainless (STEEL, Apr. 30, p. 92). Defense's Materials Advisory Board estimates that in 90 per cent of applications the 200 series can be substituted for the nickel-rich 300 series. (Industry estimates are about 75 per cent.) Either estimate is far different from the present pattern: In nine months of this year, production of 301 and 302 stainless was 189,000 tons; production of 201 and 202 only 14,000 tons. On the basis of 90 per cent substitutability, Defense estimates consumers could have saved 8500 tons of nickel and $6.8 million because of lower cost of 200 series.

Military Buying To Climb

Look for increased military spending as a result of world events. Percentagewise, the figure won't be particularly impressive but dollarwise (when you're talking about billions) it will be substantial. Much of the increase will be selectively applied to most advanced aircraft and missile weapons. Research and development will get a share. The administration will keep its fingers crossed hoping the economy will continue at full blast, keeping revenues coming in fast enough to maintain the prized balanced budget.

AEC Invites Industry

The Atomic Energy Commission wants private industry to take over the building of test reactors. If enough interest can be steamed up, the AEC will limit its building to those needed for its own use. Industry-built reactors would service civilian industry and supply irradiation services to the AEC. The Commission believes a large part of its requirements for test facilities can be met by privately owned reactors. Its aim is to free AEC personnel for work on advanced research and power reactors . . . The Atomic Energy Commission has granted 42 more access permits to industrial firms wanting restricted data.

Break for Small Business?

The Small Business Administration has asked the Securities & Exchange Commission to relax part of its proposal on small company security offerings. What the SEC wants: To qualify, the company must have shown a profit in at least one of the last five years. In the request, though, SBA Administrator Wendell B. Barnes did indicate he might agree to some kind of limitation on the par value of the issues.

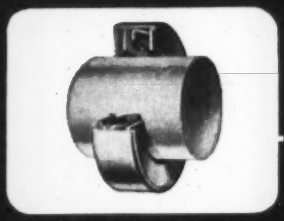
Manganese in Arkansas

The Bureau of Mines is checking on the size of manganese reserves in west-central Arkansas. Tests indicate that only some of the ore can be raised to national stockpile specifications by simple treatment. The rest would require more expensive beneficiation, such as leaching or smelting. The bureau wants to be sure enough reserves are available to justify consideration of such methods.

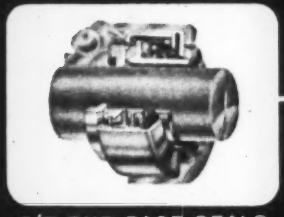
Straw in the Wind

• Westinghouse Electric Corp. has a $13.2-million Navy contract to design and furnish reactor compartment components for a nuclear powered aircraft carrier.

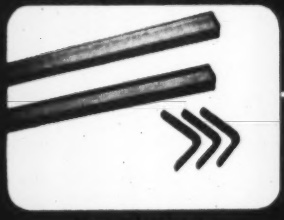
FOR PERFORMANCE PROTECTION



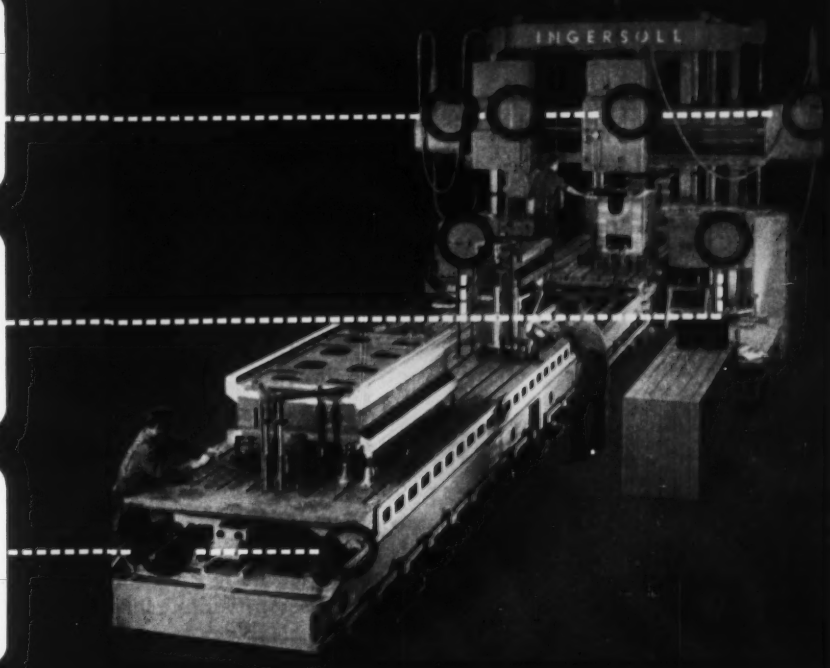
C/R SHAFT SEALS



C/R END FACE SEALS



C/R SIRVENE WAY WIPERS



C/R . . . GUARDS PRECISION, SAVES DOWNTIME, LENGTHENS SERVICE LIFE

Which seal is the best answer to your problem? C/R Engineers know. They've helped machine tool builders solve tough sealing problems—successfully—for years.

C/R SHAFT SEALS deliver outstanding sealing performance and service life on medium speed shafts, gear cases and drive mechanisms. They seal lubricants, exclude chips, coolants, abrasives—and require minimum radial and axial space.

C/R END FACE SEALS are lapped to micrometric tolerances to provide absolute lubricant retention and exclude chips, coolants and all foreign materials on high speed spindles, shafts and drives under the most critical service. Normally they operate throughout the entire life of the machine tool.

C/R SIRVENE WAY WIPERS give maximum protection to sliding assemblies under long and continuous operation, and will not lap or mark rails. Available in metal-cased, spring-loaded, and plain designs for flat, angular and circular ways.

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.

OIL SEAL C/R DIVISION

CHICAGO RAWHIDE

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In Canada: Manufactured and Distributed by Chicago Rawhide Mfg. Co. of Canada, Ltd., Hamilton, Ontario

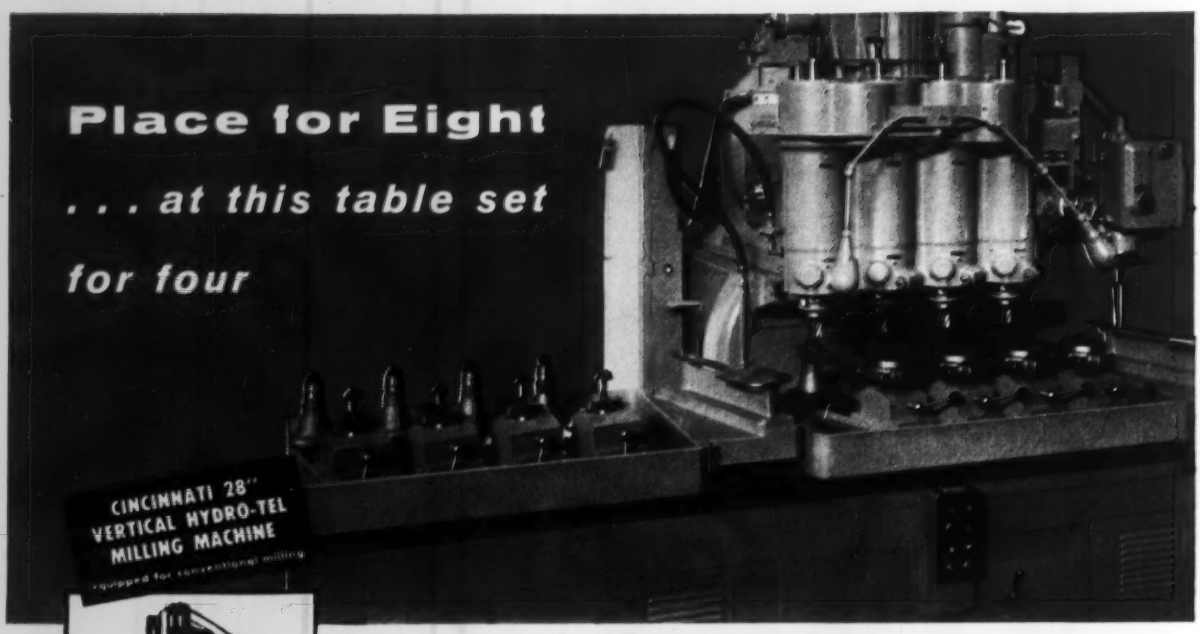
Export Sales: Geon International Corp., Great Neck, New York

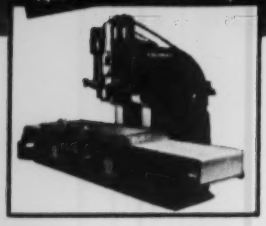
Other C/R Products

Sirvene (synthetic rubber) molded pliable parts • Sirvis-Conpor mechanical leather cups, packings, boots • C/R Non-metallic Gears

Place for Eight

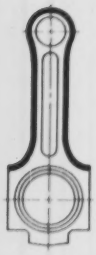
. . . at this table set for four





It's an established principle for methods engineers in the "know"... while one or a group of parts is feeding past the cutters, a second fixture mounted on the machine is reloaded for its turn at the feeding station. In many cases handling time chargeable to cost is practically nil. ¶Advantages of this principle are very much worth while for the milling operation illustrated here. A CINCINNATI® 28" Vertical Hydro-Tel, with 96" table traverse, is equipped with duplicate fixtures and a four-spindle head to automatically profile mill four connecting rods at one time. Surfaces milled are indicated in the drawing. This Hydro-Tel is equipped for 360° automatic profile milling, one of the seven ways in which Hydro-Tel machines are built for various types of work. The complete list includes:

1) Conventional milling, low series spindle speeds
2) Conventional milling, high series spindle speeds
3) Die sinking
4) 360 degree automatic profiling, non-selective
5) Die sinking and 360 degree automatic profiling, non-selective
6) 360 degree automatic profiling, selective
7) Die sinking and 360 degree automatic profiling, selective



Drawing of part. Surface outlined is automatically profile milled in one continuous cut.

28" Vertical Hydro-Tels have plenty of range for large work; 60", 96" or 120" table traverse; single spindle head or 2, 3 or 4 spindles. May we give you more information? Write for catalog M-1773-2. For brief specifications look in Sweet's Machine Tool File.

THE CINCINNATI MILLING MACHINE CO.
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MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

Chrysler's Gorey Delegates Authority

"SPELL OUT a man's responsibilities in detail, then give him the authority to do the job," advises Charles B. Gorey Jr., director of Chrysler Corp.'s manufacturing staff.

Mr. Gorey, who is 37, is responsible for product planning and analysis, production engineering, facility planning, plant engineering and quality control. "These groups must know their work and work together, or all you wind up with is a can of worms," he exclaims.

Sound Off—To keep things rolling smoothly, Mr. Gorey meets with key staff men at least once each week. "It helps to have a free exchange of ideas. We encourage the fellows in quality control and facilities planning to speak up if they have an idea which will help out product planning or production engineering and vice versa," he says.

Once all the facts are in and plans made, each department head is expected to get the job done. "Specialization is important. My department heads must know more of the technical details about their own jobs than I do. I'm here to co-ordinate and direct group activity," he adds.

Liaison—People on Mr. Gorey's staff are also trouble shooters. Any division which has quality control or other problems is free to come directly to staff specialists for help. States Mr. Gorey: "That's why we get the best men in the specialized fields."

Each staff head meets weekly with his divisional counterparts to talk over common problems. Here, diplomacy steps in where authority leaves off. "We don't have any direct line supervision over these divisional departments, so our men know that they must have the facts in making any suggestions," Mr. Gorey explains.

Background—Mr. Gorey is typical of the young management group Chrysler is forming. He was born in Detroit and attended University of Detroit, Lawrence Institute of Technology and University of Michigan Extension Service.

He joined Chrysler in 1939 and worked his way up management ranks in divisional plants. In 1947, he left the corporation to become assistant, and later, executive vice president of Stran Steel Products Co., Detroit. He returned to Chrysler's central staff in 1954 and was named director of manufacturing staff this year.

"One lifetime isn't enough to learn all about the automobile business. It's a tough competitive business and ever so often you have to take time out to shake yourself loose from the pressure," grins Mr. Gorey. His solution is weekend golf and photography.

Key Problems of Ten Companies

	Annual Sales & Employment	Major Product Manufactured
Personnel development; executive replacement	$4.5 million 320 employees	Steel kitchens
Organization of a rapidly expanding business	$4 million 300 employees	Musical toys
Market analysis; determination of profit from each product	$1.5 million 110 employees	Counting instruments
Financing an expanding company; organization	$6 million 374 employees	Road equipment
Boosting production; preventing labor turnover; financing	$2 million 150 employees	Aluminum windows & doors
Stock rearrangement; new product development	$3 million 400 employees	Electronic components, transformers
Moving away from one-man management; developing new talent	$2 million 100 employees	Structural steel fabrication
Getting personnel who want to grow; accepting responsibility along with authority	$7 million 625 employees	Ferrous & nonferrous castings
Assigning special jobs (in addition to regular duties) to company officers	$4 million 125 employees	Reinforcing steel, building supplies
Developing a team operation	$1 million 115 employees	Specialized machinery, reflective sign materials

AMA's seminar highlights problems (above) and outlines . . .

Program for Small Business

WHY does one small company fail, another succeed?

Executives of small manufacturing concerns took a deliberate look at many sides of the problem at a recent American Management Association seminar. After six days, they came up with some conclusions concerning distribution, production, cost cutting, research and development. Among them:

Distribution — Smallness can mean flexibility and quick service. But, warned market analysts: "Don't accept an order just because you can make delivery and have open productive capacity."

Charles H. Sevin, management consultant, explained: "One company made a distribution cost analysis and found that 60 per cent of its customers were bringing in only 10 per cent of its sales volume."

Another study showed that 95 per cent of all customers in one territory were unprofitable.

A small company discovered that 59 per cent of its salesmen's calls were on customers who contributed only 12 per cent to sales volume.

Point—Money and effort saved in one unprofitable marketing area can be diverted to territories where it will bring greater volume and profit. This means:

1. Company representatives should concentrate more on key customers.

2. Less productive accounts can be handled by mail or turned over to wholesalers.

3. Direct mail can keep the company name before marginal accounts. (Have salesmen make only periodic calls.)

Production — "Some simple approaches can pay big dividends," declared Herb Barchoff, president, Eastern Rolling Mills Inc. "We initiated an incentive system for our machine operators, but one man consistently made standard, while others ran behind. So we decided to take him off his machine and continue to pay him the standard rate. He trained operators who were not making standard." By learning the superior operator's methods, the others were able to increase their production, earn more money.

Cost Cutting—Production control can be used by the small company, contended Norman Tallakesen, vice president - production, Voltarc Tubes Inc. Job descriptions and evaluations, plus time and motion studies, enable the small company to set up its manufacturing specifications (productive capacity) in advance. By instituting incentive programs for line and staff workers, the small company can keep pace with the rated capacity of its production line.

Other ways to cut production costs:

1. Set up quality specifications with plus and minus tolerances.

2. Use an in-line inspection program so that faulty pieces are caught at the point of mistake.

3. Establish raw material control.

4. Estimate standard factory costs for each line of products—compare actual and standard costs each month.

5. Make long and short range sales forecasts; base production cycles on sales forecasts.

R and D—The small business has a constant problem finding money for research and development. E. C. Fiebich, engineering director, Heath Co., told seminar members of three ways to get help at minimum cost: Encourage individual efforts; try brainstorming techniques (STEEL, Apr. 23, p. 105); use engineering, research and development facilities of vendors and suppliers.

Power Brushing Gains

Some of the larger manufacturers in the field expect sales to be up 25 per cent in 1957. Key to the rapid growth: New applications and better engineering

LOOK for continued growth in the popularity of power brushes in metalworking. "Give a man a power brush, and he'll find many more uses for it than the manufacturer thought possible," points out V. F. Miller, vice president-sales, Mill-Rose Co., Cleveland.

The industry views its product as a precision cutting tool which can give you any number of finishes.

Size—About six manufacturers dominate the industry. Best guesses peg annual sales to metalworking between $35 million and $50 million. Spiral Brushes Inc., Cleveland, is figuring on a 15 per cent gain in 1957, following a 7 per cent boost this year over last.

Mill-Rose expects a 25 per cent hike in sales next year. (Its specialty is twisted wire brushes.) That will give the firm a 100 per cent increase from 1954 through 1957. Says M. V. Joy, supervisor, industrial sales, Fuller Brush Co., Hartford, Conn.: "We'll be disappointed if we don't see our sales jump 25 per cent next year. That will be after a 25 per cent increase from 1955 to 1956." Another leader, Osborn Mfg. Co., Cleveland, says its gains will be in step with metalworking's increasing sales.

And Growing—With such a rosy outlook, it's no surprise that many new companies are springing up. For the most part, they are small. Established manufacturers are expanding their operations. If a firm has been making twisted wire, for example, it may move out into wheel and cylinder brushes.

The key to growth: "Power brushes are becoming more and more a part of the production process," believes Mr. Joy.

Customers—The automotive, aircraft and steel industries represent the biggest markets. But look for atomics and rockets to make new demands on the industry. Atomics has special cleaning jobs that call for power brushes.

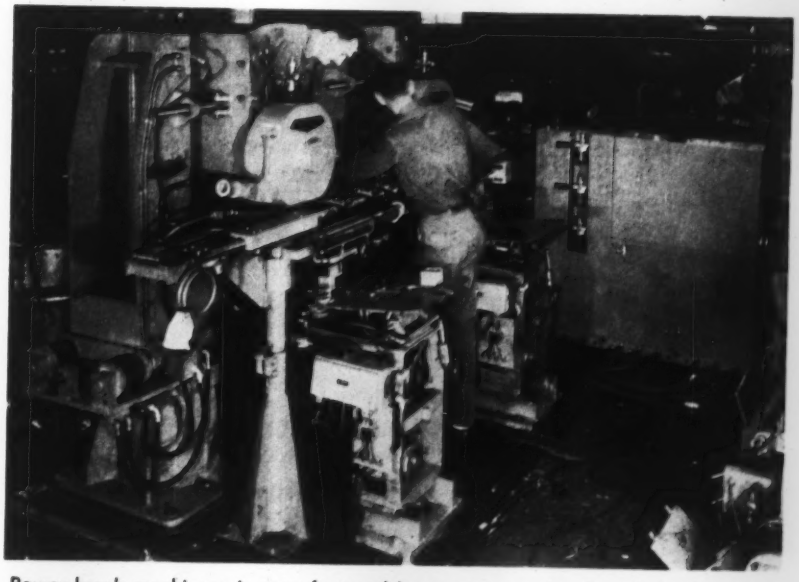
In the auto industry, Fuller makes specialty brushes that clean hoods. Automatic conveyor cleaning is another new application. Some of the more common uses include: Wire stripping, electric hot dip galvanizing, metal finishing, preplating and flash removal. Brushes can be used in hand tools and are often incorporated in drillpress installations, or as one tooling station in a turret lathe.

Reasons—"Our brushes are 90 per cent engineered for the job," says James E. Bateman, vice president - general manager, Spiral Brushes. That's his reason for his company's success. Spiral, like most firms, builds the machinery that uses its power brushes.

The source of profits in the industry is controversial. One manufacturer claims he and most other firms lose money on machinery sales, while profits come through replacement brush sales. But another large company says it loses money on machinery only by accident. Of course, machinery must be built on a profitable basis, when repeat brush business from it cannot be expected to amount to much.

Another angle to the power brush business: One firm sells almost half its output through other brush manufacturers.

Crux—This comparatively small industry is breaking through to new dimensions as metalworking as a whole expands at an increasing rate.



Power brush machinery is manufactured by most power brush makers, and is an important part of industry sales. Here's Osborn's Brushamatic being assembled

What Strikes Do To Industry

Strikes cost industry more in the first nine months of 1956 than in the same period last year. Although there were fewer strikes and fewer workers idled, the number of man-days lost was about one-third higher this year. More than 30 million man-days were lost, compared with 20.8 million lost in the same period last year.

With the steel strike over, man-days lost in September dropped to 1.5 million, compared with 3.2 million in August.

Rolled Steel Doubles

The new 56,000 sq-ft plant of Rolled Steel Corp. in Skokie, Ill., will more than double the company's facilities.

Four 7½-ton cranes have been installed to handle the sheet steel which the company supplies.

How Great Lakes Steel *charts* quality

Left: Thermocouple is inserted into an open-hearth furnace to check temperature of heat. Right: Multiple indicator records open-hearth temperature.

This view shows 12 of Great Lakes 17 open-hearth furnaces. Bright spots are furnaces being charged with pig iron and scrap. The open-hearth process takes from 10 to 12 hours.

This is the business end of a thermocouple, the rugged yet delicately accurate device that measures temperature in an open-hearth furnace. The two fine wires you see above, inside the casing, absorb heat and transmit it as an electrical current to be charted by recording potentiometers.

No chance for guesswork here—through eleven long hours the rising temperature of what will be 500 tons of Great Lakes open-hearth steel is meticulously controlled. Then, at exactly the right time and the right temperature, the glowing molten metal gushes into ladles for pouring into ingots.

The slender, spidery lines on the chart assure another heat of high and uniform quality steel. Quality that is checked and rechecked at every step to assure that customer specifications are met precisely.

Why don't we get together and talk over your steel needs? Some time soon?

GREAT LAKES STEEL CORPORATION

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NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Tech Items: Key to '57 Sales

Suspension systems and fuel injection will be closely watched. The industry may make running changes in '57. Price comparisons point up similarities among competitive brands

CHRYSLER'S torsion bar suspension and Chevrolet's optional fuel injection system bear close watching. The 1957 sales race may depend, in part, on buyer reaction to these items. Other auto makers are ready to follow suit if sales look good.

Suspension systems and fuel feeds are important engineering areas for all car manufacturers. Chrysler is taking a major step in making Torsion-Aire standard equipment as far down the line as Plymouth.

Torsion Twist—Picking up the ball where Packard dropped it, Chrysler's front end suspension unit consists of upper and lower control arms, lower control arm struts, upper and lower ball joints, shock absorbers and torsion bar springs.

Operation is based on a law of physics: An opposite and equal reaction for every action. A spring and bar combination reacts to road shocks, absorbing them before they can be transmitted to the car body. All mountings are cushioned in rubber. Ball joint pivots are spread farther apart than the former kingpin bearings, to give greater resistance to lateral push against front wheels.

Ford, General Motors, Studebaker and American Motors are keeping a sharp eye on sales reaction to Torsion-Aire. They're all in a position to make running changes this year if demand warrants. GM divisions may prefer an adaptation of the air-bellows setup which GMC Truck & Coach is making available on '57 heavy duty trucks.

Ramjet—Chevrolet is the first to announce fuel injection as optional equipment. The division views it primarily as an advertising pitch for standard models, although it will find some takers on the Corvette. Production difficulties have put dealers on the spot when prospects want the scoop on how soon fuel injection will be available.

Again, the industry will be checking to see if this device has sales appeal. Chevy's metered setup is rumored to cost $300 to $350 extra. Jack F. Wolfram, Oldsmobile general manager, reports his division also has a Rochester Products FI unit similar to Chevrolet's, but it's designed only for the Olds.

It's strictly experimental now, says Mr. Wolfram, but if the public goes for the idea, Olds may well be next to make fuel injection optional equipment. Mercury Division, Ford Motor Co., won't be far behind.

Accessories—On a lesser scale, but still interesting to watch, will be the growth of power steering and power brakes. Along with automatic transmissions, these packages are becoming "musts" as cars get heavier, longer, faster.

Buick claims it leads in power steering installations on the 1956 model run. Edward T. Ragsdale, general manager, says 51.9 per cent have been so equipped. The percentage for the industry is about 27. The average for power brakes is estimated at 24 per cent.

Says Mr. Ragsdale: "It's apparent that the motoring public has come to realize two important facts about power equipment on modern automobiles—increased safety and operating convenience." Further gains, perhaps as much as 7 to 10 per cent, are anticipated in 1957.

Introductions—Right now, Detroit is looking ahead to models which will make their bow at the National Automobile Show next month in New York. Cadillac's long awaited Eldorado brougham finally will make its debut as a production line car. A price of $12,500 has been talked about, but division sources say it will be higher than that.

Packard is expected to preview its 1957-58 line at the show. Ford will present its retractable hardtop to the public for the first time.

The name of Ford's new E car will be announced today (Nov. 19), says Richard E. Krafve, Ford vice president and manager of the Special Products Division which will bring out the series.

Steel—Behind all the new model furor lies a big question: Will auto makers tie up steel stocks as tightly as they did last year? Right now, it looks like there'll be just enough to go around.

Checking Detroit mills shows that auto company purchasing agents are confirming orders for sheet steel to be delivered toward the end of 1957's first quarter and into the second. Heaviest call is for cold-rolled sheets. The mills say they can fill present requests with little strain. Unless the car market booms more than is expected, other steel users should be able to get good delivery, too.

Prices—As seen in the accompanying table, prices are up this

U.S. Auto Output

Passenger Only	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709	461,591
October	388,922†	517,813
10 Mo. Total	4,622,918†	6,510,814
November		749,061
December		682,257
Total		7,942,132

Week Ended	1956	1955
Oct. 13	70,175	101,581
Oct. 20	88,557	137,425
Oct. 27	104,269	158,430
Nov. 3	117,583	167,278
Nov. 10	132,025†	180,754
Nov. 17	139,000*	179,250

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

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year, but not as much as some persons anticipated. Auto makers apparently are making a real effort to keep them down. The usual juggling for competitive price position is about over. For a fast comparison with '56, see STEEL, Nov. 14, 1955, p. 76.

A final note on prices: The National Automobile Dealers Association (NADA) is urging dealers to avoid padding, flaking and other sales gimmicks. Detroit cynics have likened the NADA to the UN—plenty of talk, little enforcement.

Exhaust Notes

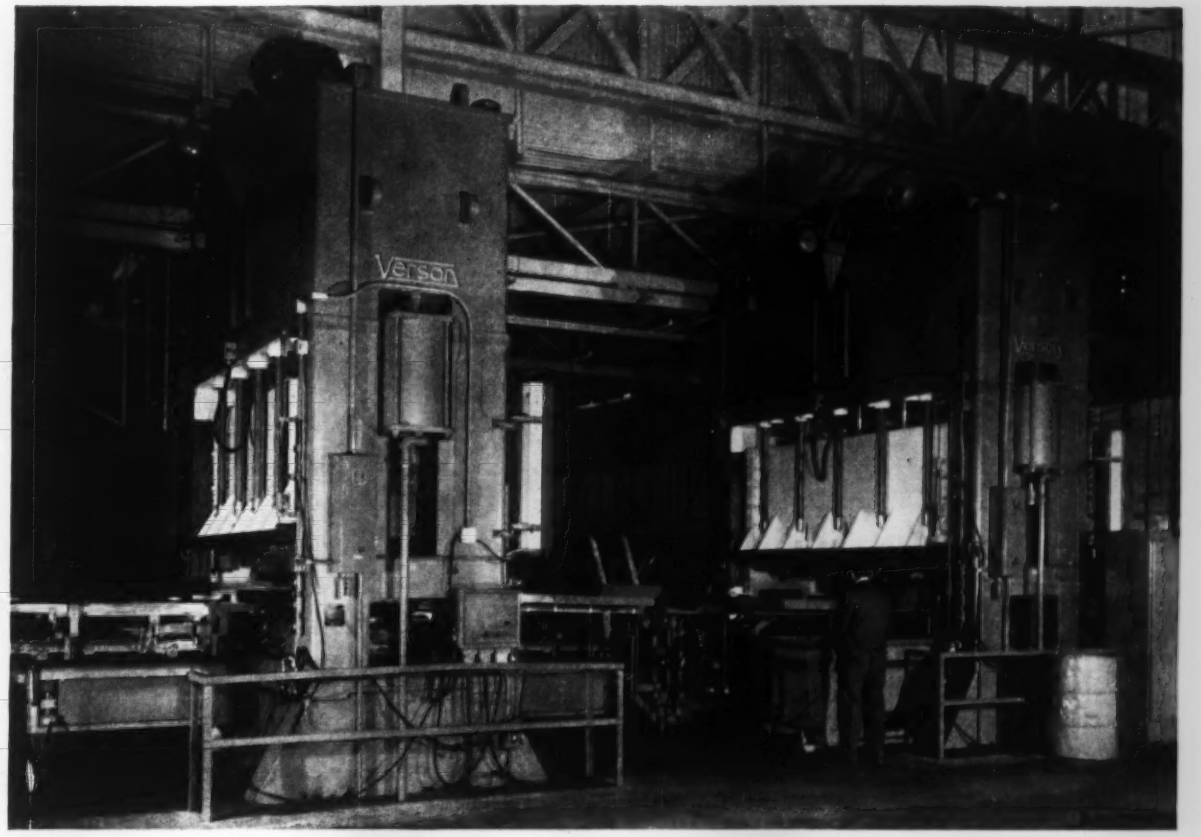
• Chevrolet, Ford and Plymouth are working most of their plants overtime. The auto industry's output this month is scheduled to reach 650,000 units, a rise of 67 per cent over the 388,900 assembled last month.

• Ford's Special Products Division, parent of the new E car, expects to have 1700 on its payroll by next July. Ultimately, the new car will create more than 15,000 new jobs in Ford plants and almost as many more in outside suppliers' facilities.

'57 4-DOOR SEDANS—WHAT YOU GET FOR YOUR MONEY

MAKE	SPECIFICATIONS								COST OF OPTIONAL EQUIPMENT				
	Price	Wheel-base	Length	Height	Shipping Weight	Max hp at rpm	Comp. Ratio	Engine Type	Auto. Trans.	Power Steer.	Power Brakes	Radio	Heater & Defroster
PLYMOUTH													
Plaza	$1849	118	204.6	56.6	3405	132/3600	8:1	LH-6‡	$179.70	$77.65	$35.00	$64.50	$64.50
Savoy	2071	118	204.6	56.6	3415	215/4400	8.5:1	V-8†	179.70	77.65	35.00	64.50	64.50
Belvedere	2179	118	204.6	56.6	3475	215/4400	8.5:1	V-8	179.70	77.65	35.00	64.50	64.50
Belvedere Hardtop	2280	118	204.6	56.6	3475	215/4400	8.5:1	V-8	179.70	77.65	35.00	64.50	64.50
DODGE													
Coronet 6	2199	122	212.2	56.6	3470	138/4000	8:1	LH-6‡	166.25	85.55	35.00	76.35	73.80
Royal V-8	2428	122	214.4	56.8	3620	245/4400	8.5:1	V-8	166.25	85.55	35.00	76.35	73.80
Custom Royal	2586	122	214.4	56.8	3690	260/4400	8.5:1	V-8	166.25	85.55	35.00	76.35	73.80
DE SOTO													
Firesweep	2479	122	215.8	56.7	3675	245/4500	8.5:1	V-8	166.25	90.00*	36.55	87.50	78.95
Firedome	2636	126	218	57	3955	270/4600	9.25:1	V-8	166.25	90.00	36.55	87.50	78.95
Fireflite	3123	126	218	57	4025	295/4600	9.25:1	V-8	Std	90.00	36.55	87.50	78.95
CHRYSLER													
Windsor	2877	126	219.2	57	3995	285/4600	9.25:1	V-8	203.75	100.00	37.00	92.80	80.00
Saratoga	3444	126	219.2	57	4165	295/4600	9.25:1	V-8	Std	Std	37.00	92.80	80.00
New Yorker	3829	126	219.2	57	4315	325/4600	9.25:1	V-8	Std	Std	37.00	92.80	80.00
Imperial	4347	129	224	56.7	4640	325/4600	9.25:1	V-8	Std	Std	Std	144.75	118.10
FORD													
Custom	1830	116	201.6	57.1	3197	142/4200	8.6:1	LH-6‡	166.40	49.50	34.80	93.50	71.44
Custom 300	2030	116	201.6	57.1	3334	190/4500	8.6:1	V-8	166.40	49.50	34.80	93.50	71.44
Fairlane	2150	118	207.7	56.2	3437	212/4500	9.7:1	V-8	166.40	49.50	34.80	93.50	71.44
Fairlane 500	2193	118	207.7	56.2	3452	212/4500	9.7:1	V-8	166.40	49.50	34.80	93.50	71.44
MERCURY													
Monterey	2380	122	211.1	56.5	3890	255/4600	9.75:1	V-8	210.00	80.00	35.00	93.00	85.00
Montclair	2885	122	211.1	56.5	3905	255/4600	9.75:1	V-8	Std	80.00	35.00	93.00	85.00
LINCOLN													
Capri	4339	126	224.6	60.2	4650*	300/4800	10:1	V-8	Std	Std	Std	142.00	126.00
Premiere	4804	126	224.6	60.2	4700*	300/4800	10:1	V-8	Std	Std	Std	142.00	126.00
CHEVROLET													
150 Series	1831	115	200	60.4	3241	140/4200	8:1	LH-6‡	175.00	65.00	35.00	65.50	45.00
210 Series	2041	115	200	60.4	3265	162/4400	8:1	V-8	175.00	65.00	35.00	65.50	45.00
Bel Air	2147	115	200	60.4	3280	162/4400	8:1	V-8	175.00	65.00	35.00	65.50	45.00
PONTIAC													
Chieftain	2260	122	206.8	60	3670	227/4600	8.5:1	V-8	215.00	100.00	36.00	92.35	85.00
Super Chief	2387	122	206.8	60.1	3695	227/4600	8.5:1	V-8	215.00	100.00	36.00	92.35	85.00
Star Chief	2550	124	213.8	60.1	3740	227/4600	8.5:1	V-8	215.00	100.00	36.00	92.35	85.00
OLDSMOBILE													
88 Series	2499	122	203.29	57	3761	230/4400	9.25:1	V-8	215.00	100.00	37.00	96.00	85.00
Super 88	2706	122	203.29	57	3897	240/4400	9.25:1	V-8	215.00	100.00	37.00	96.00	85.00
98 Series	3350	126	212.29	57	4047	240/4400	9.25:1	V-8	Std	Std	Std	96.00	85.00
BUICK													
Special	2379	122	208.4	58.4	4001	250/4400	9.5:1	V-8	205.00	100.00	36.00	93.00	85.00
Century Riviera	3004	122	208.4	58.7	4156	300/4600	10:1	V-8	Std	100.00	36.00	93.00	85.00
Super	3303	127.5	215.3	59.4	4354	300/4600	10:1	V-8	Std	Std	36.00	93.00	85.00
Roadmaster	3627	127.5	215.3	59.3	4469	300/4600	10:1	V-8	Std	Std	36.00	93.00	85.00
CADILLAC													
Series 62	4309	129.5	215.9	59.1	4595	300/4800	10:1	V-8	Std	Std	Std	141.00*	130.00*
Fleetwood 60	5054	133	224.4	59.1	4755	300/4800	10:1	V-8	Std	Std	Std	141.00	130.00
Fleetwood 75	6714	149.8	236.2	61.6	NA	300/4800	10:1	V-8	Std	Std	Std	141.00	130.00
NASH													
Ambassador V-8 Super	2750	121¼	209¼	60⅜	3597	255/4700	9:1	V-8	232.00	99.50	39.95	89.95	82.50
HUDSON													
Hornet V-8 Super	2750	121¼	209¼	60⅜	3589	255/4700	9:1	V-8	232.00	99.50	39.95	89.95	82.50
Hornet V-8 Custom	2940	121¼	209¼	60⅜	3589	255/4700	9:1	V-8	232.00	99.50	39.95	89.95	82.50
RAMBLER													
Super 6	2065	108	191.2	58	2891	125/4200	8.25:1	LH-6	188.30	59.50	36.00	69.50	76.00
Super V-8	2195	108	191.2	58.4	3179	190/4900	8:1	V-8	188.30	59.50	36.00	69.50	76.00
STUDEBAKER													
President	2193	116.5	202⅝	60	NA	210/4500	8.3:1	V-8	175.00	91.12	35.00	65.66	51.49
Commander	1976	116.5	202⅝	60	NA	180/4500	8.3:1	V-8	175.00	91.12	35.00	65.66	51.49
Champion	1868	116.5	202⅝	59.7	NA	101/4000	7.8:1	LH-6‡	175.00	91.12	35.00	65.66	51.49

*Approximate. †LH-6 available. ‡V-8 engine available. Prices are factory retail, including federal excise tax, handling and distribution charges, but exclusive of state and local taxes and transportation charges.



Two 400 ton Verson Presses

perform as one production unit to manufacture automatic dryer bodies

Catalog G-56 describes the entire Verson line and gives design details and specifications. Write for your copy, today.

The two 400 ton Verson eccentric presses shown above, integrated with automatic handling equipment and controlled by one operator, perform as a single production unit in the manufacture of automatic clothes dryer bodies for a leading appliance manufacturer. The press on the left blanks and forms the dryer body and draws the front face with door opening. The parts then move automatically to the press on the right for flanging and punching operations. Speed is 14 strokes per minute.

Verson presses are engineered to become an integral part of the production process in which they are used. If you make stampings of any kind, this approach to your problems can mean big savings. Send an outline of your requirements today and put real production know-how to work for *you!*

A Verson Press for every job from 60 tons up.

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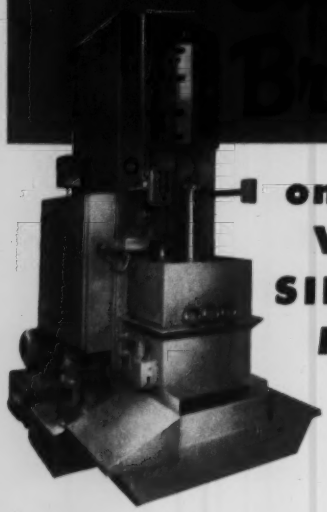
UNUSUAL TOOLING SETUP FOR

External Surface Broaching

on DETROIT VERTICAL SINGLE RAM MACHINE



This broaching job requires rigidity and perfect alignment . . . which makes it a "natural" for the massive Detroit Vertical, built and tooled by experts. Note the safety feature which prevents the main slide from descending until dual push buttons have been operated. This slide holds the heavy, pot-type broach holder in perfect alignment with the fixture post, which is mounted on a fixed knee for even greater accuracy.

Detroit Vertical Single Ram machines are available in standard capacities from 5 to 25 tons, stroke length from 30″ to 90″. Interchangeable knees with shuttle table mechanism can readily convert this machine into a standard for future production needs. Oversize platens on all standard models allow multiple as well as single station tooling.

Detroit builds every size and type of broaching machine, automates and tools them to fit your needs. Call in a Detroit field engineer, or send us details of your production problem . . . today.

PART—Automotive transmission component.

OPERATION—Broach 4 external lugs, equally spaced.

TOOLING—Pot-type broach holder, built in sections for convenient tool assembly . . . in perfect alignment with fixture post.

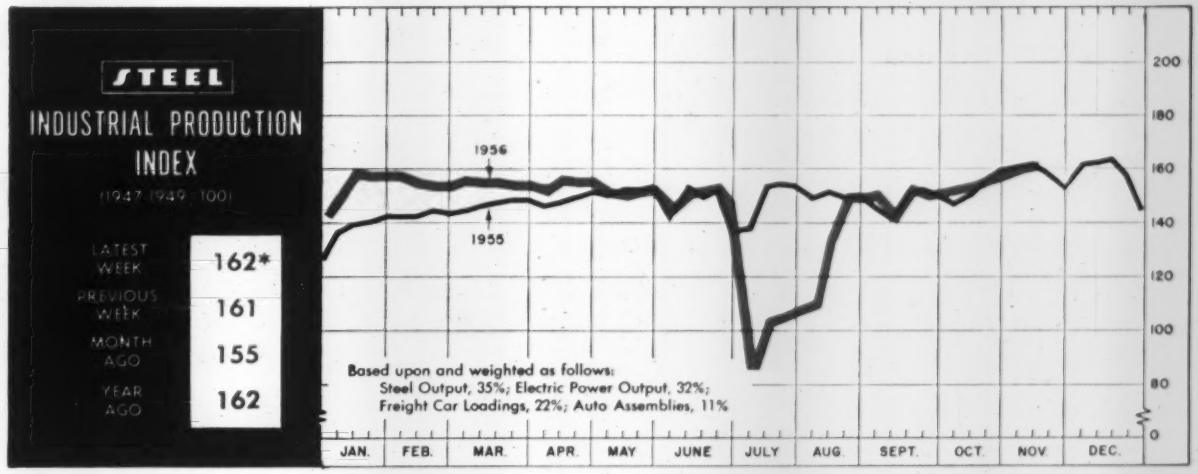
CYCLE—Operator loads work over fixture on top of post, starts machine. Broach holder descends with ram and bottoms after cutting stroke. Operator unloads work and presses palm button for return stroke.

PRODUCTION—120 parts per hour.

MACHINE—Detroit 10-ton Vertical Single Ram Broaching Machine with 42″ stroke and fixed knee.

Write for new free bulletin on Detroit Vertical Single Ram Machine

DETROIT BROACH
A MACHINE COMPANY
DEPARTMENT P-11
ROCHESTER, MICHIGAN



*Week ended Nov. 10.

Growing Backlogs Assure Good Business

FOR THOSE who need reassurance of continued good business well into 1957, a study of sales, new orders and backlogs can be enlightening. Unfilled orders, especially, are mounting at a record pace.

Latest Department of Commerce figures place backlogs of all manufacturing industries at an all-time high of $62.3 billion in September, an increase of 17.5 per cent over September, 1955. The durable goods industries account for $59.6 billion of the total, an increase of 20.2 per cent over the year. It would take a sizable business decline to wipe this unfinished business off the books—and such a downturn is not indicated by the high level of sales and new orders.

Favorable Balance—New orders continue to run ahead of sales by a significant amount. Seasonally adjusted figures for September put new orders at $28.2 billion, production at $27.7 billion. Only once this year—in March—has production exceeded new orders. Third quarter reports and sales forecasts by many metalworking companies point to a continuation of this situation—at least through the first half of next year. So backlogs will continue to grow, giving industry an even greater cushion against any unforeseen cutbacks.

There are few exceptions to this trend in metalworking. Heavy equipment producers are especially outstanding. Elliott Co. reports a backlog of $35 million on Sept. 30, against $30 million on June 30. At Bucyrus-Erie Co. the comparison is $28.7 million vs. $14 million. Mack Trucks Inc. advanced from $53.4 million a year ago to $75.1 million on Sept. 30. Joy Mfg. Co. reports an increase of 35 per cent. Alco Products Inc. says its backlog "remains high at $51.8 million."

Aircraft companies join the group with $711 million on Sept. 30, against $601 million a year before (McDonnell Aircraft Corp.); $3.23 billion vs. $2.6 billion last year (Boeing Airplane Co.). About one-sixth of Boeing's backlog is civilian jet airliners. Almost all

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,472[1]	2,463	2,394
Electric Power Distributed (million kw-hr)	11,500[1]	11,487	10,878
Bituminous Coal Output (1000 tons)	10,525[1]	10,440	10,180
Petroleum Production (daily avg—1000 bbl)	6,975[1]	6,981	6,890
Construction Volume (*ENR*—millions)	$281.0	$350.1	$267.9
Auto, Truck Output, U. S., Canada (*Ward's*)	162,959[1]	144,097	215,221
TRADE			
Freight Car Loadings (1000 cars)	795[1]	800	797
Business Failures (Dun & Bradstreet)	271[1]	267	237
Currency in Circulation (millions)[3]	$30,964	$30,794	$30,657
Dept. Store Sales (changes from year ago)[3]	−3%	+2%	−7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,988	$21,768	$18,272
Federal Gross Debt (billions)	$275.0	$275.6	$279.8
Bond Volume, NYSE (millions)	$15.8	$18.6	$15.9
Stocks Sales, NYSE (thousands of shares)	9,147	10,599	9,351
Loans and Investments (billions)[4]	$85.6	$85.6	$85.6
U. S. Govt. Obligations Held (billions)[4]	$26.0	$25.9	$30.6
PRICES			
STEEL's Finished Steel Price Index[5]	225.58	225.58	208.90
STEEL's Nonferrous Metal Price Index[6]	255.7	256.3	264.0
All Commodities[7]	114.9	114.9	111.2
Commodities Other Than Farm & Foods[7]	123.0	123.0	119.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,895; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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Off-the-floor Warehouse Steel Helps Keep a Ceiling On Your Inventory

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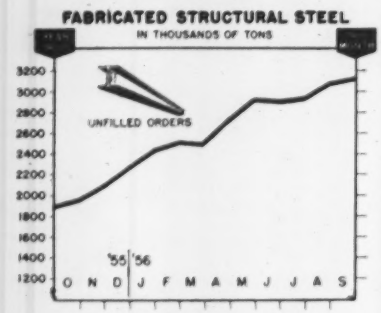
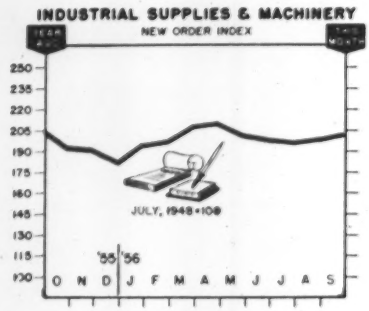
THE BUSINESS TREND



	Shipments 1956	Shipments 1955	Backlogs 1956	Backlogs 1955
Jan.	251.5	225.8	2,408	1,346
Feb.	285.4	213.4	2,476	1,360
Mar.	306.8	227.8	2,463	1,392
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,592
June	284.7	282.3	2,859	1,706
July	165.5	219.4	2,904	1,639
Aug.	213.5	268.0	3,076	1,776
Sept.	240.9	289.1	3,108	1,854
Oct.	....	283.8	....	1,928
Nov.	....	258.9	....	2,075
Dec.	....	248.0	....	2,243
Total	....	2,979.4		

American Institute of Steel Construction.



	1956	1955	1954
Jan.	192.7	164.4	139.8
Feb.	195.9	175.1	140.5
Mar.	206.7	186.9	141.5
Apr.	208.6	173.7	131.9
May	200.6	191.6	129.4
June	197.8	189.1	136.4
July	195.6	163.7	119.4
Aug.	196.8	181.2	132.5
Sept.	200.7	203.2	148.1
Oct.	....	190.0	136.3
Nov.	....	189.7	146.2
Dec.	....	180.0	148.8

Amer. Supply & Machinery Mfrs.' Assn.

Charts copyright, 1956, STEEL.

segments of metalworking are enjoying the same kind of backlog situation.

Inventories?—After cutting into their inventories during and after the steel strike, manufacturers have started adding to stocks to support this higher level of activity. In September, all manufacturing inventories stood at $50.1 billion, seasonally adjusted, or $600 million above the August level. While this is a record, it doesn't seem to be too high. The First National City Bank of New York comments: "A downturn in the flow of new orders and sales would, of course, result in inventories becoming top heavy. But until such a downturn is clearly established over a significant period, the weight of inventories alone is not likely to precipitate a business decline."

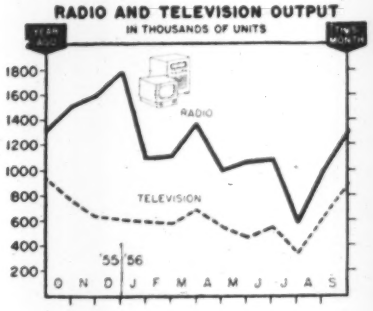
Retail Sales Still Ahead

Sagging retail sales have given some manufacturers cause for alarm recently. In two of the last three weeks, department store sales have dropped below the year-ago weeks. But the Federal Reserve Board points out that to date they are running about 4 per cent ahead of the corresponding period of last year. When appraising the over-all retail trade picture, it must be remembered that lower auto sales account for much of the apparent decline. But the situation isn't too bad. After spurting mildly in August, September retail sales settled back to the July rate of $16 billion, then advanced to $16.3 billion last month. Says Philip M. Talbott, president of the National Retail Dry Goods Association: "Consumer buying is holding to its record levels, and retailers are predicting the best fall and Christmas sales in history . . . We expect our sales for 1956 to top last year's records by 3 to 5 per cent." Even taking into account the increased cost of living, 1956 will end up slightly better than 1955.

Construction Records

Construction is in a declining trend, but it is seasonal. Figures for construction put in place and awards were strong enough last month to set October records. The departments of Labor and Commerce report that outlays for new construction totaled $4.1 billion, almost $100 million ahead of those

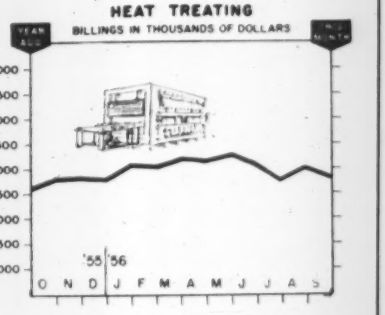
RADIO AND TELEVISION OUTPUT
IN THOUSANDS OF UNITS



	Radio		Television	
	1956	1955	1956	1955
Jan.	1,079	1,068	588	655
Feb.	1,094	1,090	576	703
Mar.	1,360	1,482	680	831
Apr.	993	1,100	550	583
May	1,060	1,114	468	467
June	1,073	1,205	553	590
July	567	718	337	344
Aug.	991	948	613	648
Sept.	1,319	1,302	894	940
Oct.	....	1,500	...	760
Nov.	....	1,581	...	632
Dec.	....	1,786	...	605
Totals	....	14,895	...	7,757

Radio-Electronics-Television Mfrs. Assn.

HEAT TREATING
BILLINGS IN THOUSANDS OF DOLLARS



	1956	1955	Per Cent Gain Or Loss*
January	3,082.8	2,181.0	+ 41.4
February	3,045.2	2,184.5	+ 39.4
March	3,226.2	2,599.5	+ 24.1
April	3,172.0	2,579.5	+ 23.0
May	3,292.3	2,644.4	+ 24.5
June	3,094.5	2,645.1	+ 17.0
July	2,762.5	2,180.0	+ 26.7
August	3,040.7	2,439.3	+ 19.9
September	2,832.9	2,581.0	+ 6.2
October	.....	2,785.1	.....
November	.....	2,809.1	.....
December	.....	2,786.6	.....
Total	.....	29,601.2	.....

*Compared with year-ago month.
Metal Treating Institute.

in October, 1955. Only private housing showed weakness. Through ten months this year, outlay is 3 per cent ahead of that in the corresponding 1955 period.

Building plans showed no seasonal decline. *Engineering News-Record* says heavy construction contract awards in October rose 27 per cent over September's and set a new high mark for the month. October's $1.9 billion boosted the ten month total to $18.4 billion, another record, and 17 per cent above the January-October period last year. The October weekly rate was exceeded this year only by March.

Employment, Earnings Rise

Employment and earnings continue to bull their way ahead. In October, a record 52.4 million workers were on nonfarm payrolls, 190,000 more than in previous-record September. Much of the gain was in manufacturing, with the five basic metalworking classifications all showing increases in production workers. As a group, primary metals, fabricated metal products, nonelectrical and electrical machinery and transportation equipment rose from 5,349,900 in September to 5,477,100 last month. The transportation industry contributed heavily to the total with the return of full production on new cars. The figure should go even higher in November.

Net spendable earnings of factory workers also reached an all-time high in September. Take-home pay of a worker with a wife and two children reached $74.04 a week, compared with $72.94 a week in August. Hourly wages reported indicate that take-home pay in October will show another increase.

Production Index Climbs

STEEL's industrial production index continued its steady climb by reaching the high mark for the year during the week ended Nov. 10. The preliminary figure is 162 (1947-1949 = 100), just 2 percentage points shy of the all-time record set last December. While steel production holds steady, electric power output and auto production continue to strengthen. Freight car loadings follow a seasonal decline. With the auto industry on the verge of solving its production and supply problems, the increases should overbalance the decreases, resulting in a production record.

A message to a leading

PROJECT ENGINEER

Would you consider a change—new climate, locale, living conditions—unique challenge, permanency and more than commensurate rewards?

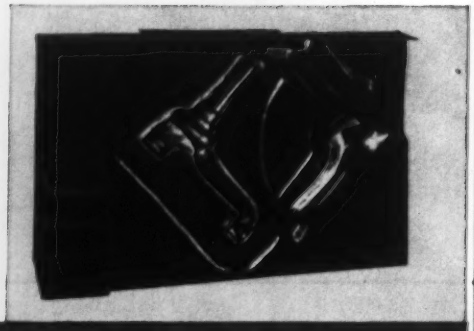
Kaiser Engineers is seeking a man of unusual skill and experience. He must have at least 10 years of progressive integrated steel plant development experience. He must know plant layout, construction design, and be of managerial caliber. He will be charged with the continued development of new steel plants and the expansion of existing plants in the U.S. and abroad. His salary will be more than generous.

This man and his family will enjoy indoor-outdoor living in the mild, smog-free San Francisco Bay Area. Here are fine new schools and famous Universities, the culture and sophistication of San Francisco, plus year around recreational opportunities ranging from sea to Sierra and including all sports.

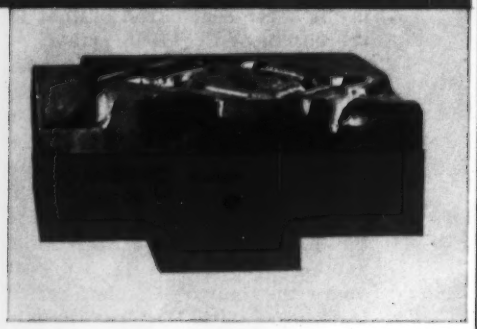
This man will enjoy, too, life insurance, free family health plan, retirement, moving allowance and other perquisites.

Can you qualify? Are you interested? If so, why not write today in strictest confidence, to Mr. Robert Bates at the address below.

KAISER ENGINEERS
1924 BROADWAY
OAKLAND 12, CALIFORNIA



just like the first one . . . it's from Heppenstall Die Blocks



Holding close tolerances in the production of these automobile spindles calls for die blocks that can really stand up under rough duty. This company found the answer in Heppenstall Hardtem Die Blocks . . . and important, too, is the longer than usual production runs they get before resinking.

Machinability of Heppenstall Hardtem is another feature well recognized by veteran die sinkers. This long standing Heppenstall reputation has been built by savings in cutting time, longer tool life, and more accurate sinkings.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide hardness range to match varying customer requirements of service and machinability.

If you have a problem of die block machinability or service life, contact your Heppenstall Representative. He can quickly get the one best answer for you.

These five Heppenstall warehouses carry stocks of the most popular size die blocks:

Bridgeport 5, Conn. • Detroit 32, Mich. • Indianapolis 27, Ind. • Los Angeles 22, Calif. • Pittsburgh 1, Pa.

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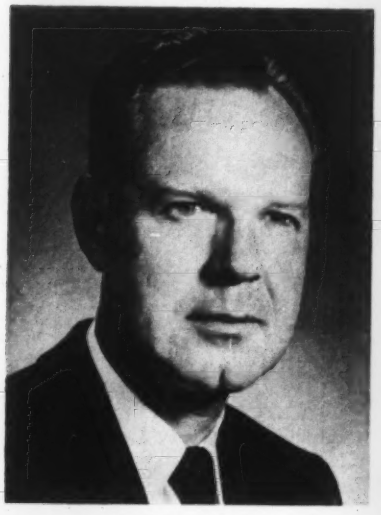


K. H. ZINSMASTER
. . . heads new dept. at Aro Equipment

K. H. Zinsmaster, director of purchases, heads a new department of **Aro Equipment Corp.,** Bryan, O., as manager of procurement and production planning.

Robert C. Ressler was appointed vice president-manufacturing and engineering, ball and bearing division, **Hoover Ball & Bearing Co.,** Ann Arbor, Mich. He was plant manager, Bearings Co. of America Division, Federal - Mogul - Bower Bearings Inc.

James H. Broderick was made sales manager, **Geometric Tool Co.,** division of Greenfield Tap & Die Corp., New Haven, Conn. He was acting field sales manager and in his new post will be in charge of both inside and outside sales.

William M. Day was made director of engineering at **Bryant Mfg. Co.,** Chicago. He formerly headed the engineering program of Perfection Industries, a division of Hupp Corp.

Hoyt W. Jones was made purchasing agent for the **Pacific Switchgear Division,** Federal Pacific Electric Co., San Francisco. He held a similar post with the Ordnance Division, Rheem Mfg. Co.

Clifford V. Coons was elected executive vice president and vice chairman, executive committee of **Rheem Mfg. Co.** He is in New York.

JOHN M. DOLAN
. . . Giddings & Lewis executive sales post

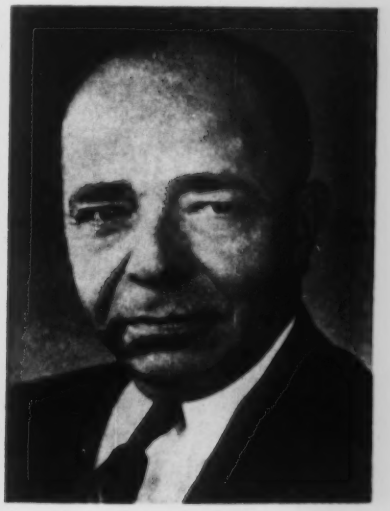
John M. Dolan was appointed vice president-general manager, field sales division, **Giddings & Lewis Machine Tool Co.,** Fond du Lac, Wis. He was with Solar Aircraft Co. as vice president-sales and manager of proprietary and commercial products. He formerly served as vice president-sales, Hydraulic Press Mfg. Co.

George M. Chandler was named sales manager, **Carmet Division,** Allegheny Ludlum Steel Corp., at Ferndale, Mich. He replaces **Paul F. Rehner,** now on special assignment for the corporation. Mr. Chandler was with General Electric Co.'s metallurgical products department.

Howard H. Wilder, assistant manager-engineering sales, was promoted to manager of engineering sales, **Vanadium Corp. of America,** with headquarters in Chicago.

Kearney & Trecker Corp. appointed **John Burg** eastern district manager; **Alfred Hostvedt,** metropolitan New York manager.

At the Waukegan, Ill., Works, **American Steel & Wire Division,** U.S. Steel Corp., **Donald F. Sengenberger** was made superintendent-wire division; **Harvey R. White,** superintendent-stainless steel division; **John W. Cunningham,** superintendent-straight and cut department.



K. D. CASSIDY
. . . group executive, Ford Motor divs.

K. D. Cassidy was made group executive for steel, general products and manufacturing services divisions of **Ford Motor Co.,** Dearborn, Mich. He succeeds **S. W. Ostrander,** now vice president-special assignments, reporting to the president and chairman. **W. J. Reilly,** general manufacturing manager for the steel division, succeeds Mr. Cassidy as general manager of the division.

Michigan Seamless Tube Co., South Lyon, Mich., appointed **Oswald Tower Jr.** to the president's office on special assignment. He is succeeded as plant superintendent by **Walter M. Northey. Melvin F. House Jr.** was made assistant plant superintendent.

Chevrolet Motor Division, General Motors Corp., appointed **Earl L. Armstrong** purchasing agent at its Parma, O., plant; **George Pamerleau,** purchasing agent, Muncie, Ind., plant.

Clarence G. Bauer was made quality control manager for **Chrysler Corp.'s** stamping division, Detroit. He succeeds **John J. Pathe** who was promoted to the general manager's staff.

Marshall B. Harrison and **Burton C. Smith** were made assistant vice presidents in the San Francisco sales organization of **Columbia-Geneva Steel Division,** U.S. Steel Corp. **Alex Walker Jr.** was made

WALTER L. BROUGH
. . . Hercules Motors executive v. p.

RAY PONTIOUS
. . . Bethlehem Pacific's Seattle mgr.

ARTHUR J. REED
. . . McKay Machine purchasing agent

intermountain district vice president-sales, with headquarters in Salt Lake City, Utah.

Walter L. Brough, assistant to the president, **Hercules Motors Corp.,** Canton, O., was elected executive vice president.

L. L. Dodge was made assistant general sales manager of **Dana Corp.,** Toledo, O.

Joseph D. Jambro was made engineering manager, carbon and graphic divisions, **Speer Carbon Co.,** Niagara Falls, N. Y.

Robert H. Madden Jr. was made manager and **James M. Edge,** assistant manager of metallurgy, inspection and research at U.S. Steel Corp.'s **Tennessee Coal & Iron Division,** Birmingham. Mr. Madden succeeds **Elmer F. Harris,** recently made manager of the new production planning division.

Carl E. Rowe, assistant general manager, was named vice president-general manager, **Milwaukee Valve Co.,** Milwaukee, subsidiary of Control Co. of America.

Irvin R. Spangler was made assistant sales manager, machine and tools division, **Michigan Tool Co.,** Detroit.

Clyde R. Dean Jr., director of export sales, **Yale Materials Handling Division,** Yale & Towne Mfg. Co., Philadelphia, was promoted to general sales manager.

Ray Pontious, assistant superintendent of **Bethlehem Pacific Coast Steel Corp.'s** Los Angeles bolt and nut plant, was made superintendent of the Seattle bolt making plant. He replaces **Harold Blackmur,** now head of the Los Angeles operation.

Townsend Co., New Brighton, Pa., reorganized its technical sales department under **George A. Bentley,** general sales manager. **W. L. Nicolay,** formerly assistant sales manager-western division, succeeds Vice President **H. C. Weidner Jr.** as manager of technical sales. Mr. Weidner, who headed the technical sales department, will also serve as vice president of Impact Products Inc., Orangeville, O., a new affiliate. **John J. Perz** was made product manager of lock bolt sales.

Richard D. Boutros was promoted from chief engineer to vice president and director of engineering at **Mixing Equipment Co.,** Rochester, N. Y.

Kenneth B. Kilbourne joined **Wyle Laboratories,** El Segundo, Calif., as administrative assistant to the president. He was director of quality control for Standard Coil Products Co.

General Logistics, Pasadena, Calif., appointed **Glenn Atchley** industrial sales manager for its new industrial products division. He formerly was midwestern sales manager at Detroit.

Arthur J. Reed was named general purchasing agent of **McKay Machine Co.,** Youngstown. He was purchasing agent.

Foundry Services Inc., Columbus, O., appointed **Frank S. Bilton** purchasing agent and traffic manager. He was with Leeds & Northrup Co.

Kenneth J. McIlraith was made administrative vice president, **Moog Valve Co. Inc.,** East Aurora, N. Y.

Roy Hawkes was made purchasing agent for **Harper Electric Furnace Corp.,** Buffalo.

David Meyer joined **Illinois Tool Works,** Chicago, as sales engineer for the southern Indiana territory. He succeeds **Ray Blakeman** who was promoted to an executive position in the tool and machine division at Chicago.

Moraine Products Division, General Motors Corp., Dayton, O., appointed **Norman L. Gebhart** director of purchasing and material control; **John W. Quinn,** general superintendent of manufacturing.

C. E. Hartsing was made sales manager, **Toledo Pipe Threading Machine Co.,** Toledo, O.

James H. Allen was made plant manager of General Motors Corp.'s **Buick-Oldsmobile-Pontiac Assembly Division** at Kansas City, Kans. He succeeds **Wallace E. Wilson,** made general manager of the

J&L cold drawn ELECTRICWELD tubing now available with a superior SPECIAL SMOOTH I.D. finish

Reduces your over-all production costs in applications like these . . .

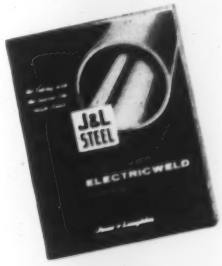
- **cylinder tubing**
- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like inside surface finish is today busy helping manufacturers reduce or entirely eliminate costly machining on many applications and is being substituted for more costly types of steel tubing. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

J & L Cold Drawn ELECTRICWELD Tubing with a *Special Smooth* ID finish combines the physical advantages imparted by today's modern electric welding techniques with those of cold working. It withstands high internal hydrostatic pressures, carries heavy torsion loads, resists high-frequency vibration, and offers a favorable weight-to-strength ratio for applications in which loading occurs in all directions.

J & L Cold Drawn ELECTRICWELD Tubing can be furnished in its three specifications in OD sizes from ½ inch to 2⅞ inches and in wall thickness from 20 to 10 gage, 0.035 and 0.134 inch respectively.

A new booklet provides the information you need . . . specifications . . . tolerances . . . chemistry . . . mechanical properties . . . annealing . . . finishes.



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COMPANY _____

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CITY _____ ZONE _____ STATE _____

DOUGLAS R. STARRETT
. . . L. S. Starrett executive v. p.

ALLEN W. ROCKWELL
. . . American Brass v. p.-Waterbury Div.

SAL CAMPODONICO
. . . Allen-Stevens vice president

Rochester, N. Y., Products Division.

Douglas R. Starrett was elected executive vice president of **L. S. Starrett Co.**, Athol, Mass. He was vice president in charge of plant operations.

Francis P. Blonska was made administrative assistant in sales at **Cleveland Cap Screw Co.**, Cleveland.

Warren E. Milner was made manager of the Milwaukee plants of **AC Spark Plug Division**, General Motors Corp., a new post.

General Electric Co.'s specialty transformer department, Ft. Wayne, Ind., named **Ray H. Rogers** sales manager - industrial components; **Harold W. Fisher**, manager of sales to distributors, contractors, users. **A. M. Krakower** is manager-electronic components sales.

Allen W. Rockwell was made vice president in charge of the Waterbury, Conn., division of **American Brass Co.** He succeeds **Ralph T. Benedict**, retired. Mr. Rockwell was division manager.

J. J. Keane was made assistant general sales manager, **Landis Tool Co.**, Waynesboro, Pa. He was manager of the Detroit sales office.

Nikoh Tube Co. appointed **William P. Burke** vice president-general manager of its Chicago mill. Mr. Burke was vice president-general manager, Hokin Aluminum Co., a division of International Rolling Mills until its recent acquisition by Kaiser Aluminum & Chemical Corp. **Edward J. Simborg** and **William J. Allison**, also with Hokin Aluminum, have joined Nikoh Tube. Mr. Simborg will head engineering and research activities; Mr. Allison becomes assistant to the general sales manager, tube division.

Sal Campodonico was elected vice president, **Allen - Stevens Corp.**, Woodside, N. Y. He was plant supervisor.

Delevan Electronics Corp., East Aurora, N. Y., subsidiary of Amherst Mfg. Corp., appointed **Clifford W. Fichtner** general sales manager. He was western division manager, National Sales Executives Inc.

H. L. Mills was made Chicago district sales manager, **Pittsburgh Steel Co.**, to succeed **Kenneth H. Bender**, now manager of secondary sales, Pittsburgh.

Richard Owen was made general manager, **Martin Grinding & Machine Works Inc.**, Chicago, succeeding **William B. Grant**, resigned.

Robert S. Wareham, assistant sales manager, was promoted to sales manager of **Wilson Steel & Wire Co.**, Chicago.

OBITUARIES . . .

Edgar Dixon, 62, vice president-chief metallurgist, **Ladish Co.**, Cudahy, Wis., died Nov. 4.

Edward R. Wagner, 83, chairman, **E. R. Wagner Mfg. Co.**, Milwaukee, died Nov. 4. He founded the firm in 1900 and was its president until 1953.

Ralph Finney Jr., 79, retired president, **Jackson Steel & Iron Works**, San Diego, Calif., died Oct. 29.

Don W. Switzer Sr., 56, sales manager, industrial lift and elevator division, **Joyce-Cridland Co.**, Dayton, O., died Oct. 29.

K. P. Fuhrmann, 67, retired sales executive of **Wheeling Steel Corp.**, Wheeling, W. Va., died Oct. 30.

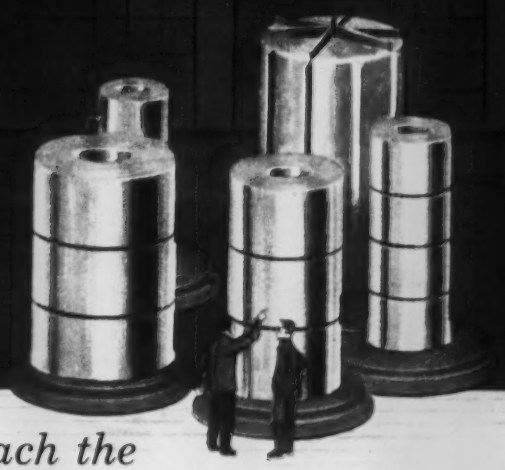
William G. Carter, 62, president, **Faitoute Iron & Steel Co. Inc.**, Newark, N. J., died Nov. 5.

Robert J. Woods, 52, a founder of **Bell Aircraft Corp.**, Buffalo, and director of engineering and sales in the newly formed aircraft division, died Nov. 3.

William W. Myers, former president, **Weller Hardware & Foundry Co.**, Elmira, N. Y., died Nov. 5.

FIFTH OF A SERIES

Customer's Report



"No other type of furnace can approach the high load factor of single stack annealing"

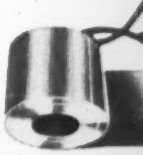
In plants where single stack furnaces have been installed and where multiple stack equipment was previously used, the universal comment is, "Our load factor in the Lee Wilson single stack furnace is higher than we ever thought possible in any type of furnace equipment."

Theoretically, for a given tonnage, the same number of coils of various sizes must be loaded on the pedestals, and it is contended that the load factor must be the same for all furnaces. However, when four to eight times as many coils have to be used to make up a charge, it is just not possible to arrive at the same number of average tons per pedestal as it is for single stack furnaces.

Our customers' reports on this matter from many sources all agree that no other type of furnace can approach the high load factor of single stack annealers!

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS



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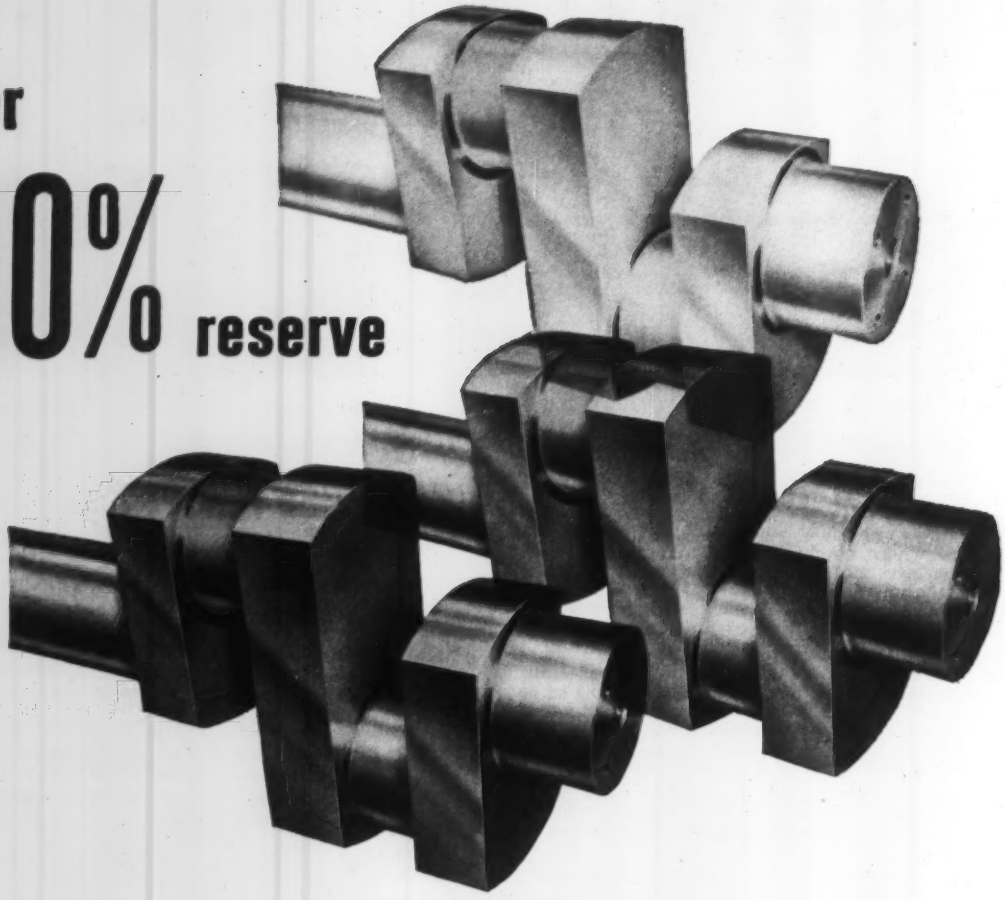
SINGLE-STACK RADIANT TUBE ANNEALING FURNACES
MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES

The trend is to single stack. One of the nation's largest annealing departments recently put into operation 24 Lee Wilson Single Stack Furnaces and 72 bases.

Over 300% reserve



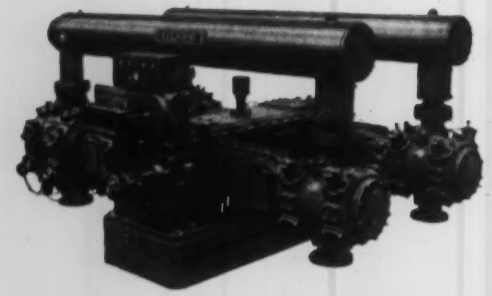
Built in the Crankshafts of many Clark Balanced/Opposed Compressor Models

Extra-heavy crankshafts are standard equipment on Clark Balanced/Opposed compressors . . . it's brought about by standardization.

All models of a particular stroke size have the same bearing and crankshaft diameter. As an example, the number one crankpin of all CMA models is capable of transmitting with complete safety 600 BHP. The CMA-2 rated at 150-300 BHP and the CMA-4 rated at 350-500 BHP therefore have a tremendous reserve. The same thing applies to the 14" and 17" stroke CRA and CBA models.

Rugged shaft construction assures maximum bearing life and minimum maintenance. It also eliminates the need for a bearing between opposing cylinder crankthrows which would double the force couple between opposing cylinders and in turn increase shaft stress and foundation requirements.

Your nearest Clark representative will be pleased to give you all the facts on the original Balanced/Opposed compressors, or write for bulletin 118.



CLARK 350 BHP BALANCED/ OPPOSED AIR COMPRESSOR

CLARK BROS. CO., OLEAN, NEW YORK
One of the Dresser Industries
Offices in Principal Cities Throughout the World

CLARK **Balanced/Opposed Compressors**

Retools Auto Plant

Willys allocates $3.4 million for purchase of equipment to boost output in Brazil

WILLYS MOTORS Inc., Toledo, O., a subsidiary of Kaiser Industries Corp., Oakland, Calif., is investing $3.4 million in Willys-Overland do Brazil, Sao Paulo, Brazil. The funds will buy basic machinery and tools to equip a plant which will manufacture gasoline internal combustion engines.

The project is being undertaken to expand the firm's operations in support of the Brazilian government's efforts to promote the growth of its automobile industry. Hickman Price Jr. will be in charge of the Brazilian organization, with offices in Sao Paulo.

Plans Purchases—The Brazilian firm also has arranged for a loan which will provide funds for the purchase of additional machinery, equipment and tooling. In addition, it has a 12-month revolving credit with a group of American and Brazilian banks. It'll be used for the importation of American component parts supplied by Willys Motors Inc.

The Brazilian firm, which is operating a Willys Jeep assembly plant in Sao Paulo, will build an engine plant in that city to house the equipment supplied by Willys Motors. When it is completed, Willys-Overland do Brazil will be able to manufacture a larger percentage of the components for its vehicles than ever before. Capacity of the plant will be 1500 engines a month.

Wolverine Opens New Branch

Wolverine Tube Division, Calumet & Hecla Inc., Detroit, opened new offices and mill depot facilities at 4500 Kalamath St., Denver 11, Colo. The facilities will be operated by W. G. Cline & Co., western agent for Wolverine Tube.

Beaird Installs Furnace

Installation of a $160,000 stress relieving furnace has been completed at the Shreveport, La., plant of J. B. Beaird Co. Inc., manufacturer of heavy steel products. The furnace accommodates a vessel 12 ft in diameter, 78 ft long. It will enable Beaird to diversify its markets and improve the strength and quality of its products.

Federal Steel Building

Federal Steel Corp., processor and distributor of sheet and strip steel, is building a warehouse at 3327 Elkton Ave., Dayton, O. It will replace quarters at 1934 E. Monument Ave., that city.

Du Pont May Enlarge Plant

E. I. du Pont de Nemours & Co. Inc., Wilmington, Del., may build a sodium and chlorine production unit as an addition to its plant at Memphis, Tenn. Tentative plans call for operations to start in mid-1958. If authorized, the new unit will represent an increase of more than 50 per cent in the company's sodium capacity. Metallic sodium is used in the manufacture of tetraethyl lead, in the descaling of stainless steel, in the production of titanium and in a number of widely-used sodium compounds.

Leases Space in Massachusetts

Cannon Electric Co., Los Angeles, expanded its east coast facilities by leasing of 100,000 sq ft of space in Salem, Mass., for operation by its Diamond Division. Cannon Electric purchased Diamond Mfg. Co., Wakefield, Mass., last December. The firm makes multicontact connectors for the aviation, electronics and broadcasting industries.

Plate Fabricator Opens Plant

McGregor-Michigan Corp., steel plate fabricator, has started operations at its new heavy fabricating plant (on Helen, south of McNichols), Detroit. Although construction will not be completed until mid-1957, much of the equipment has been moved from the plant at 5818 Rivard, that city. It is being equipped with machinery for bulkier and heavier plate fabricating than the company has handled previously. The firm's general offices, sales and engineering departments remain at the Rivard plant.

Gregory Industries Expanding

Gregory Industries Inc., Toledo, O., plans a 30 per cent expansion in manufacturing and engineering facilities at the Lorain, O., plant of its Nelson Stud Welding Division. A 55,000 sq-ft addition to the plant will be erected.

Forms New Department

Fort Worth Steel & Machinery Co., Ft. Worth, Tex., established a new department to design, sell and install complete conveying and elevating systems for industrial use. L. B. Temple, vice president, heads the department.

Vitro Gets Uranium Contract

Vitro Uranium Co., a division of Vitro Corp. of America, New York, has signed a multimillion dollar contract with the Atomic Energy Commission for the production of uranium concentrates. Under the contract, Vitro will spend a maximum of $1.2 million for expanded production and installation of a solvent extraction process for uranium ore treatment. The firm's Salt Lake City, Utah, mill will expand its policy of purchasing ores from independent mines.

Norden-Ketay To Move

Norden-Ketay Corp. leased a building being constructed in Stamford, Conn., to house executive offices now in New York and to establish a central research laboratory for missile work. The firm designs and makes electronic, electrical and mechanical precision control instrumentation and systems.

Youngstown Buys Two Furnaces

Youngstown Sheet & Tube Co., Youngstown, purchased two furnaces for its new seamless mill at Indiana Harbor, Ind., from the Industrial Furnace Division of Gas Machinery Co., Cleveland. One is a rotary-hearth billet heating furnace which is 80 ft in diameter; the other is a three-zone tube normalizing furnace which is 58 x 70 ft. They can handle 100 tons per hour continuously. Taylor-Wilson Mfg. Co., Pittsburgh, will furnish

(*Please turn to page* 130)

GISHOLT

GISHOLT MASTERLINE NO. 12
AUTOMATIC PRODUCTION LATHE

MASTERLINE
GISHOLT SINCE 1887

Sixty-nine years of machine tool experience have gone into this latest design of the Gisholt MASTERLINE No. 12 Automatic Production Lathe. An important contribution to metal-cutting progress, it is ready to produce faster, better and at lower cost—with even less requirements for operator skill and effort. May we tell you the complete facts about it—and how it may be profitably applied to your manufacturing processes?

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Look ahead—keep ahead—with Gisholt

Whether it's the x-ray spectrograph utilized for chemical analysis . . .

. . . the automation gaging systems that provide positive, fully automatic control of steel strip thickness . . .

. . . or our all-new *metallurgical laboratory (replacing our previous lab facilities), fully staffed and equipped for metallurgical and chemical research, development and quality control . . .*

. . . WALLINGFORD HAS THE COMPLETE FACILITIES AND METHODS NECESSARY TO ASSURE QUALITY FROM RAW METAL TO FINISHED COIL, TUBE OR PIPE!

If quality is included in your specifications, call on Wallingford, where quality is not a word but a commandment! Write for your copy of "Wallingford Quality Tubing and Pipe" and Technical Data Sheets on super metals you are interested in.

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SUPER METALS
STAINLESS • ALLOY • HIGH CARBON • LOW CARBON • STRIP
STAINLESS WELDED TUBES AND PIPE

(*Concluded from page* 127)

the walking beam mechanism for the normalizing furnace.

Plans Fifth Canadian Plant

Electric Storage Battery Co. (Canada) Ltd. will build a 142,000 sq-ft plant in Toronto, Ont., which will represent an investment of more than $1 million. It will be the fifth plant operated by the company in Canada and the fourth in the Toronto area.

Mogul To Build in Albany

General Mogul Bearing Co., Detroit, will erect a building in the Albany, N. Y., area.

Ettco Tool Changes Name

Ettco Tool Co., Brooklyn, N. Y., changed its name to Ettco Tool & Machine Co. Inc. The firm now makes a line of machines for small hole drilling and tapping, as well as its older tool and attachment lines. Plant facilities have been doubled in the last 12 months.

Central Foundry To Expand

Central Foundry Co., Newark, N. J., has obtained a loan of $2 million to improve and modernize its cast iron soil pipe plant at Holt, Ala.

City Machine Changes Hands

City Machine & Mfg. Co., Cleveland, has been purchased by a group of industrialists headed by T. W. Gulley who was named president and treasurer. The firm makes equipment for steel mills and blast furnaces.

American Hoist Pacific Formed

American Hoist & Derrick Co., St. Paul, organized a wholly owned subsidiary, American Hoist Pacific Co., to produce custom-engineered heavy material handling equipment. Emphasis will be on extra high capacity lifting devices used to test nuclear weapons. General office, sales, engineering, accounting and purchasing departments will be at 4975 Third Ave. S., Seattle. Officers are: J. E. Carroll, chairman; R. J. Stoddard, president; C. D. Gould, vice president and

CONTROLLED SPEED
DOUBLE COOLING

NO SLIP
NO STORAGE
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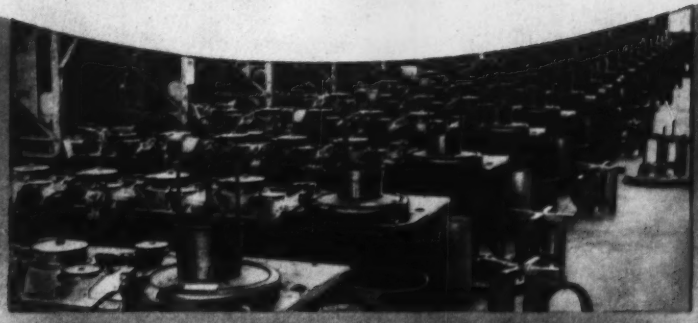

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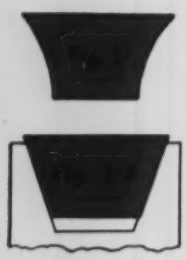
COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Concave sides make V-belts last longer



The sides of every Gates V-belt (Fig. 1) are concave—a precisely engineered curve that greatly increases V-belt life. Here's why:

On the bend around the sheave, the concave sides of a Gates V-belt fill out and become straight (Fig. 1-A). Thus the belt makes full contact with the sides of the sheave, grips the sheave evenly, and wear is distributed evenly across the sides of the belt. Uniform wear lengthens belt life; keeps costs down.

Make this simple test

Take a straight-sided belt (Fig. 2) and bend it. Feel the sides at the bend; they bulge out. Now picture this bulge in the sheave groove (Fig. 2-A). It is easy to see that the belt makes uneven contact at points indicated by arrows. Naturally, wear is greater at these points. Uneven wear shortens belt life; increases belt costs.

Cut down-time and V-belt replacement costs. Specify belts that grip evenly and wear longer . . . specify Gates Vulco Rope—the V-belt with concave sides. There is a Gates distributor nearby who will quickly supply the belts you need. The Gates Rubber Co., Denver, Colorado

—World's Largest Maker of V-Belts

TPA 88

Gates VULCO ROPE Drives

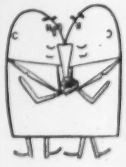
general manager; Harry Bratt, vice president in charge of engineering.

Prenco Products Expands

Prenco Products Co. has occupied additional space on Lakeshore road, Toronto, Ont. It will make metal oxide impregnating compounds for castings, impregnating equipment and gas-bonded binders.

Builds Plant in Canada

Canadian Baker Perkins Ltd., a subsidiary of Baker Perkins Inc., Saginaw, Mich., is building a plant and office building in Toronto, Ont. The firm makes machinery.



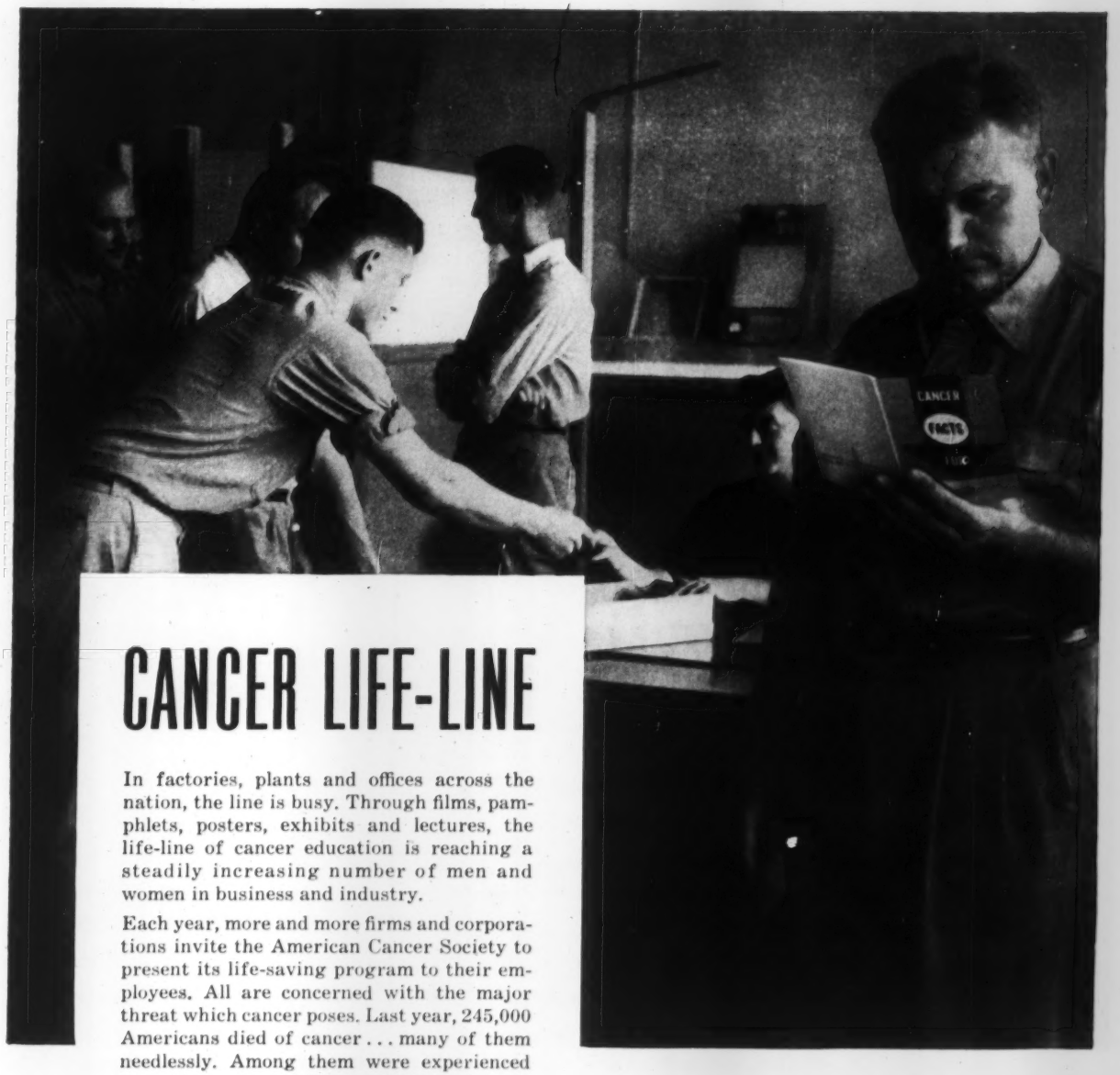
CONSOLIDATIONS

Union Twist Drill Co., Athol, Mass., purchased controlling interest in **R. Stock & Co.** and its wholly owned subsidiary, **Hartex Machine & Tool Works**, West Berlin, Germany. R. Stock makes twist drills and other metal cutting tools; Hartex produces several varieties of precision grinding machines. Union Twist Drill will provide additional machinery and equipment, as well as technical assistance, to the West Berlin firm which will be operated as a subsidiary.

Youngstown Sheet & Tube Co., Youngstown, purchased **Emsco Mfg. Co.**, Los Angeles, and will operate the property as a division. **Johnston Pump Co.**, a division of Emsco at Pasadena, Calif., will continue its operation as a division of Youngstown Sheet & Tube.

Winnipeg Brass Ltd., a division of Canadian Bronze Co. Ltd., Montreal, acquired **Western Canada Bronze Co.**, Winnipeg, Man. Winnipeg Brass has been associated with the foundry, machine shop and electroplating industry since 1913.

L. A. Young Spring & Wire Corp., Detroit, purchased **Extruded Hinge Co.**, Ypsilanti, Mich. The newly acquired facility is equipped with special machinery which fab-



CANCER LIFE-LINE

In factories, plants and offices across the nation, the line is busy. Through films, pamphlets, posters, exhibits and lectures, the life-line of cancer education is reaching a steadily increasing number of men and women in business and industry.

Each year, more and more firms and corporations invite the American Cancer Society to present its life-saving program to their employees. All are concerned with the major threat which cancer poses. Last year, 245,000 Americans died of cancer . . . many of them needlessly. Among them were experienced executives, key officials, skilled workers. Their loss to business was incalculable. The greater loss, in terms of personal tragedy, was appalling.

Yet, thousands and thousands of them could have been saved *if they had known the importance of going to their doctors in time.* Early detection plus prompt treatment could literally mean the difference between life and death. This, and many other facts of life about cancer, are part of the education program which the American Cancer Society offers you – in your plant or factory. For additional information, call the American Cancer Society office nearest you, or write to "Cancer" in care of your local Post Office.

AMERICAN CANCER SOCIETY

Our challenge stands—

—anything that can be made of steel sheets can be made of

WHEELING

SOFTITE®

GALVANIZED SHEETS

What manufacturer *doesn't* want to cut costs and improve his product? The big question is *how!*

The manufacturer of this valve head cover, for instance, accomplished *both* objectives by using Wheeling SOFTITE Galvanized Sheets instead of conventional cold rolled sheets. Ordinary galvanized sheets were out of the question. They just couldn't take it.

Wheeling SOFTITE takes this severe stamping in stride with no flaking or peeling...and stays rust-resistant far longer.

That's because SOFTITE is the ultimate in tight coated galvanized sheets. So tight, in fact, you can use it to make anything you can make of steel sheets.

That's SOFTITE, developed and perfected by the same company that originated Cop-R-Loy, the original copper-bearing steel pipe, and DUCTILLITE, the original cold reduced tin plate. Now... SOFTITE, the tightest-coated galvanized steel sheet, another quality product of Wheeling Steel Corporation, Wheeling, West Virginia.

IT'S WHEELING STEEL

DISTRICT SALES OFFICES: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Houston, New York, Philadelphia, St. Louis, San Francisco, Wheeling.

ricates continuous hinge and hinge-type connector sections for military aircraft and missiles.

Landers, Frary & Clark, New Britain, Conn., household appliance manufacturer, bought **Standard Products Corp.** and an affiliate, **Everett E. Young Co.,** both of Whitman, Mass.

Capitol Products Corp., Mechanicsburg, Pa., maker of aluminum building products, merged with **Read Standard Corp.,** York, Pa., producer of bakery and chemical plant equipment.

Tiffin Art Metal Co., Tiffin, O., and **Squire Heating Supply Co.,** Columbus, O., have consolidated. The Squire firm will be operated as a subsidiary of Tiffin.

Majority stock control of **Trailmobile Canada Ltd.,** Toronto, Ont., is being acquired by **National Steel Car Corp.,** Hamilton, Ont. A major expansion program is being prepared for Trailmobile, maker of truck trailers.

Tecumseh Products Co., Tecumseh, Mich., purchased **Taylor Sales Engineering Corp.,** Elkhart, Ind., maker of small stampings and precision assemblies.

NEW ADDRESSES

Concord Control Inc. moved into its new building at 1282 Soldiers Field Rd., Boston 35, Mass. The firm designs, develops and manufactures advanced industrial control systems.

Dumont-Airplane & Marine Instruments Inc., Clearfield, Pa., moved its **Research & Development Laboratory** to 601 W. College Ave., State College, Pa.

Sutorbilt Corp. established its manufacturing and service facilities at 2966 E. Victoria St., Compton, Calif.; its sales and engineering offices are at 5200 E. 60th St., Maywood, Calif.

Sutter Products Co., manufacturer of foundry machinery and

(*Please turn to page* 138)

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11
WHAT'S THE MOST ECONOMICAL WAY?
See page 9
Some good things to know about Metal Cleaning
OAKITE PRODUCTS INC

Oakite's FREE Booklet on Metal Cleaning

answers many questions that mean better production, more profit for you. Just look at the table of contents:

- Tank cleaning methods
- Electrocleaning steel
- Electrocleaning nonferrous metals
- Pickling, deoxidizing, bright dipping
- Applying iron phosphate coatings in preparation for painting
- Applying zinc phosphate coatings
- Cleaning, removing rust and conditioning for painting in one operation
- Machine cleaning methods
- Paint stripping
- Steam-detergent cleaning
- Barrel finishing, burnishing
- Better cleaning in hard water areas
- Treating wash water in paint spray booths
- Rust prevention
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FREE Write for your copy of this 44-page illustrated booklet.

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OAKITE PRODUCTS, INC.
34E Rector St., New York 6, N. Y.

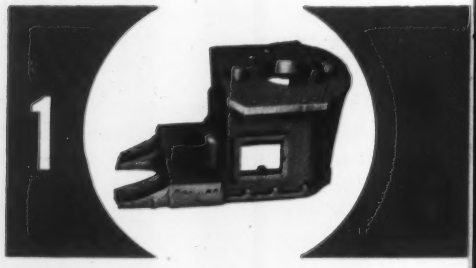
Send me a copy of your booklet "*Some good things to know about Metal Cleaning*"

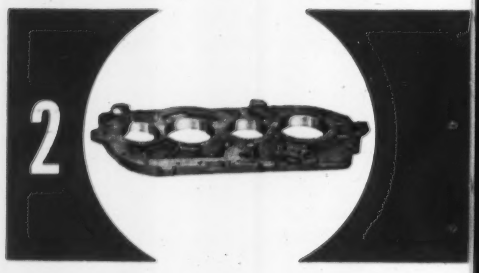
NAME

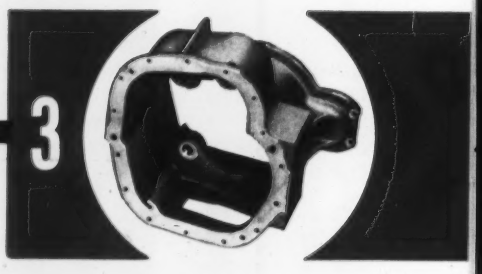
COMPANY

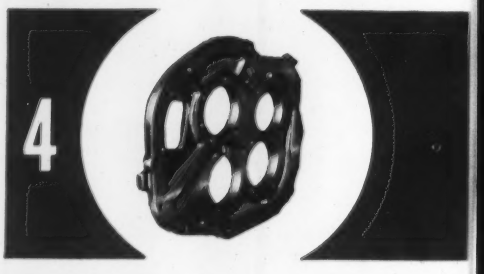
ADDRESS

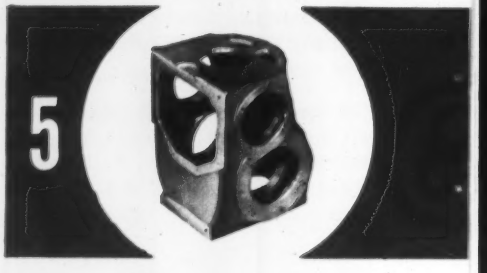
5 DIFFERENT WORKPIECES PROCESSED ON ONE W. F. & JOHN BARNES SPECIAL MACHINE











Versatile Tooling and Special Machine Precision Lower Costs, Improve Quality of Motor Grader Transmissions

This W. F. & John Barnes unit, designed and built for the J. D. Adams Manufacturing Co., Indianapolis, Ind., combines all the built-in advantages of a special machine . . . yet it machines not one, but FIVE separate and dissimilar workpieces that together form a complete transmission housing. Ingenious planning of spindle arrangement, tooling, and fixtures enables only 31 spindles to perform a total of 53 operations on the five workpieces. Special fixtures and numbered gauges locate the work and tooling quickly and accurately . . . complete change-over from one housing section to another averages only six hours.

Engineering and building a distinctive machine like this just doesn't happen by accident . . . it's the result of over 75 years of accumulated knowledge in a highly specialized field. That's why at Barnes you'll find the creative skills, plus complete and adequate facilities, for designing and building better machines to lower your production costs . . . improve product quality.

ASK FOR AN ANALYSIS OF YOUR PRODUCTION METHODS

Find out how Barnes' unique creative and specialized resources can help you cut costs. Your problem will be given expert and individual attention.

W. F. & JOHN BARNES

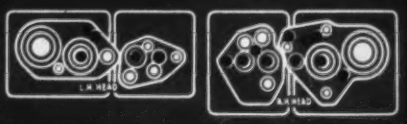
BUILDERS OF BETTER MACHINES SINCE 1872

MULTIPLE SPINDLE DRILLING • BORING • TAPPING

LOWER TRANSMISSION CASE

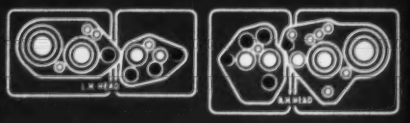
Drawings illustrate the spindle arrangement in the opposed heads and how they are individually tooled to perform chamfering, rough, semi-finish and finish boring, and facing operations in the five different workpieces. Two auxiliary heads mounted at right angles to the machine bore dowel holes in the Final Drive Housing.

INTERMEDIATE PLATE



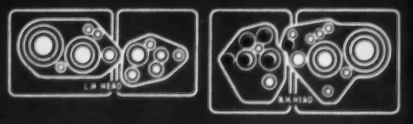
Overall view of Barnes Machine in the J. D. Adams plant. Note compactness of unit, which occupies little more space than a good size lathe.

UPPER TRANSMISSION CASE

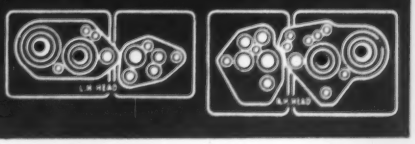


Closeup of fixture used for Upper Transmission Case. Note rings for quick removal. Spindle housings are divided and gear boxes separated from housings to minimize heat rise.

UPPER TRANSMISSION CASE COVER



FINAL DRIVE HOUSING



INVESTIGATE BARNES' 6-POINT MACHINE TOOL BUILDING SERVICE . . .

A Coordinated Creative Engineering and Manufacturing Service designed to help you solve problems quickly and efficiently. Write today for your free copy of *"Coordinated Machine Engineering"*.

W. F. & JOHN BARNES COMPANY • 434 SOUTH WATER ST., ROCKFORD, ILLINOIS

MACHINES • AUTOMATIC PROGRESS-THRU AND TRANSFER TYPE MACHINES

CM Lodestar

ENTIRELY NEW
differently NEW

FLEXIBLE LINK CHAIN

PUSH-BUTTON CONTROL

FEATURING:

- Push Button Control
- Ultra-Modern Regenerative Electric Braking
- Self-Adjusting Heavy Duty Magnetic Brake
- Sealed-in Lifetime Lubrication
- Overload Protection
- Fully Enclosed Components
- Lowest Headroom
- "CM-Alloy" Flexible Link Chain

CAPACITIES: from ⅛ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up
F.O.B. Factory

Built to serve you without costly maintenance

Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

CHISHOLM-MOORE HOIST DIVISION
Columbus McKinnon Chain Corporation
Tonawanda, New York
REGIONAL OFFICES: NEW YORK • CHICAGO • CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ontario

CM HOISTS AND CHAIN

(*Concluded from page* 135)

equipment, moved to Hadley and Grant streets, Holly, Mich. The 44,000 sq-ft building will more than triple the firm's plant facilities.

ASSOCIATIONS

N. P. Hayes, president, Carolina Steel & Iron Co., Greensboro, N. C., was elected president of the **American Institute of Steel Construction Inc.**, New York. Other officers are: First vice president, H. Buckley Dietrich, Dietrich Bros. Inc., Baltimore; second vice president, J. M. Straub, Ft. Pitt Bridge Works, Pittsburgh; treasurer, E. P. Stupp, Stupp Bros. Bridge & Iron Co., St. Louis. L. Abbett Post was re-elected executive vice president, the top administrative job.

Gray Iron Founders' Society, Cleveland, elected these officers: President, J. Scott Parrish Jr., Richmond Foundry & Mfg. Co. Inc., Richmond, Va.; vice president, A. M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass.; secretary, A. H. Renfrow, Renfrow Foundry, Los Angeles; treasurer, H. J. Trenkamp, Ohio Foundry Co., Cleveland; assistant treasurer, C. R. Garland, W. O. Larson Co., Grafton, O.

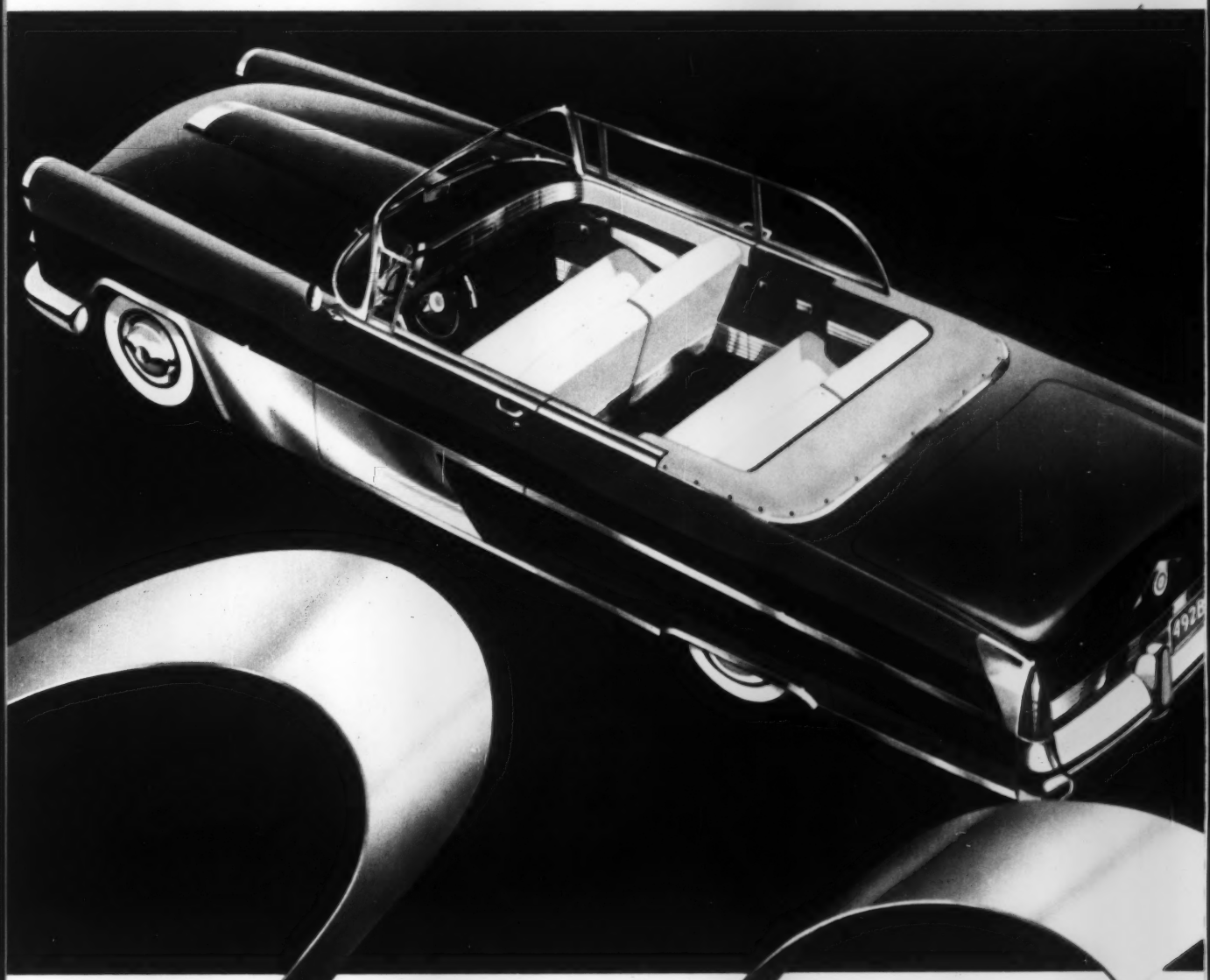
REPRESENTATIVES

United States Steel Corp.'s United States Steel Supply Division, has been appointed a general line industrial distributor in Los Angeles for aluminum products turned out by **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif. Aluminum products to be carried at the warehouse at 2087 E. Slauson Ave., Los Angeles, will be sheets, plates, rods, bars and extruded shapes. F. J. Bruckmer is Los Angeles district manager for United States Steel Supply.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., appointed W. L. Van Winkle steel mill roll sales representative in the Pittsburgh area.

the bright spots

in any automobile picture



FUNCTIONAL AND DECORATIVE TRIM OF

stainless steel

BRIGHTWORK of time-proved *stainless steel* sparkles invitingly on the car dealer's floor . . . shines as it serves, year after year . . . gleams like new when the car is old! For built-in luster that foils corrosion, plus super-strength to resist dents and scratches, design and specify STAINLESS STEEL . . . the quality metal that speeds acceptance of your cars—on *first sale and resale!*

Superior

stainless strip steel

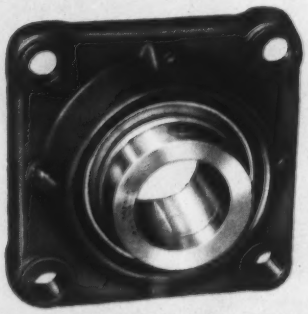
Superior Steel

CORPORATION

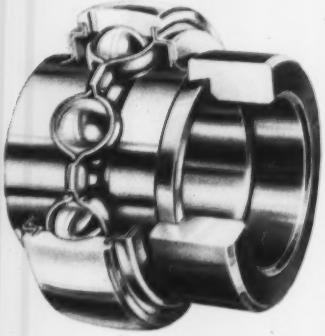
CARNEGIE, PENNSYLVANIA

NEW! Fafnir Wide Inner Ring Ball Bearings with PLYA-SEALS . . . *contact type*

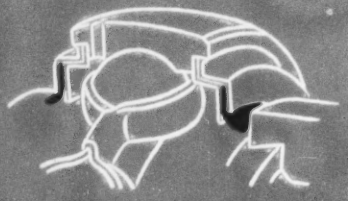
A most important feature
. . . on slow-speed applications where service conditions are excessively dirty and moist



RCJ Flange Cartridges
(Standard Series)



RAK, RAS Pillow Blocks
(Standard Series)



Plya-Seal Construction
— for wide inner ring ball bearings. A synthetic rubber, contact-type seal located between two "dished" steel plates for extra rugged support.

With the addition of this version of PLYA-SEALS to the Fafnir line of wide inner ring ball bearings, you can be more selective in the type of sealed bearing you specify and install. Where service at slow to moderate speeds demands most effective protection against contaminants, especially air-borne dust, dirt and grit, the Plya-Seal type offers the advantages of contact seals, tested and proven by years of service.

Plya-Seal Wide Inner Ring Bearings are optional on the standard series Pillow Blocks and Flange Cartridges. They are dimensionally interchangeable with the Fafnir Mechani-Seal. Flared lip and clearance between inner supporting seal member and inner ring O.D. keeps seal from pushing in. Plya-Seals do not absorb contaminants, thus their surface won't glaze and lose its efficiency. *Fafnir Wide Inner Ring Bearings equipped with Plya-Seals are relubricatable!*

Here's an opportunity to improve operations, reduce servicing, eliminate loss of lubricant, provide the most effective protection from contaminants. For new Bulletin on Plya-Seal Wide Inner Ring Ball Bearings, ask your Authorized Fafnir Distributor or write The Fafnir Bearing Co., New Britain, Conn.

FAFNIR
BALL BEARINGS
MOST COMPLETE LINE IN AMERICA

STEEL
November 19, 1956

Technical Outlook

NEW METAL LAMINATES— Bridgeport Brass Co., Bridgeport, Conn., announces it's making a wide range of duplex and triplex metal laminates which have a true metallurgical bond. Thicknesses of the metals can be varied. Combinations include stainless and mild steels, Monel, copper, brass, titanium and the precious metals. A few uses reported by Bridgeport: Appliances, autos, aircraft, electronics, condensers and heat exchangers, nuclear power and guided missiles.

NUCLEAR LUBRICANT— Lubrication of the 60 control mechanisms which move uranium rods in and out of the reactor was a problem for the builders of Britain's Calder Hall atomic power plant. Molybdenum disulphide proved to be the answer. It's applied by dry treatment with a "Molytox" varnish developed by Rocol Ltd., London. A liquid silicone varnish containing molybdenum disulphide is used for a few of the toughest spots.

AUTOMATIC ASSEMBLY— International Business Machines Corp., has contracted with Multra Corp., a subsidiary of Barnes Engineering Co., Stamford, Conn., to build an automatic assembly machine which will sort, feed and assemble IBM electrical re'ay parts. Nine are involved: A frame, two springs, an armature, a coil, an adjusting plate and three screws.

POWER WITH LESS WATER— Here's a way to lick a water shortage. A gas turbine requires only one-third the amount of water needed by a steam turbine of the same rating. So the Altos Hornos de Mexico steel mill, Monclave, Mexico, wil! use exhaust gases (750°F) from a gas turbine in a waste heat boiler. The boiler will drive a steam turbine which runs an air compressor for blast furnace blowing. Westinghouse Electric Corp., Pittsburgh, is building the installation. It'll use 3,655,000 cu ft of natural gas daily.

STICK BETTER— At the recent Paint Industries Show in Cincinnati, the Bakelite Co., New York, announced the development of new primers which greatly improve the adhesion of vinyl dispersion coatings to metal. Flat sheets coated with plastisol or organisol systems can be formed without loss of adhesion or rupture of the finish.

TITANIUM WIRE CLOTH— Cambridge Wire Cloth Co., Cambridge, Md., is making titanium wire cloth. Many of the standard mesh sizes available in stainless steels can be produced. Some applications of this corrosion resistant material: Filtering, assemblies, catalysts and screens.

STEPPED-UP CAPACITY— Cooper - Bessemer Corp., Mt. Vernon, O., reports it can increase the operating pressures of its older type 1000-psi horizontal compressors made of cast iron to 2000 psi by substituting compressor cylinders made of nodular iron.

CHEAPER GOLD FINISH— Hanovia Chemical & Mfg. Co., East Newark, N. J., says it has developed an "amazingly economical" heat treatment method of app'ying 22-carat gold coatings on ceramics, porcelain enamel and stainless steel. An area of 50 to 60 sq ft can be covered for $17. Some applications: Store fronts, lettering on porcelain enamel, trademarks and emblems on appliances, and architectural finishes of many types.

Metalworking Outlook—p. 93 *Market Outlook—p. 209*

Atomic Business . . . How You Can Get It

Now is the time to lay the groundwork to get your share of future metalworking business in atomics. You'll need information, clearances for contacts and someone close to management who understands the principles

ANY estimate of the business potential in the atom will look conservative five years from now.

Look for a chain reaction of growth to be touched off by such business catalysts as the success of the *Nautilus* . . . the letting of other submarine and ship reactor contracts . . . the construction of some 16 power reactors and many more research reactors . . . the statement in the McKinney report that the nuclear aircraft program "will require between half a billion and one billion dollars to accomplish . . ."

This profile of the infant industry will give you some idea of business to come:

Size: The AEC has $6.8 billion invested in plants — about three times what General Motors has in plants and equipment!

Buying power: Over $15 billion has been spent on the atom in this country—not bad when you consider that this has been almost exclusively a government program!

Supporting industries: Uranium is a $500 million a year business. Nearly 100 companies, most of them small, are selling $40 million worth of radiation instruments to government and industry yearly.

The Outlook

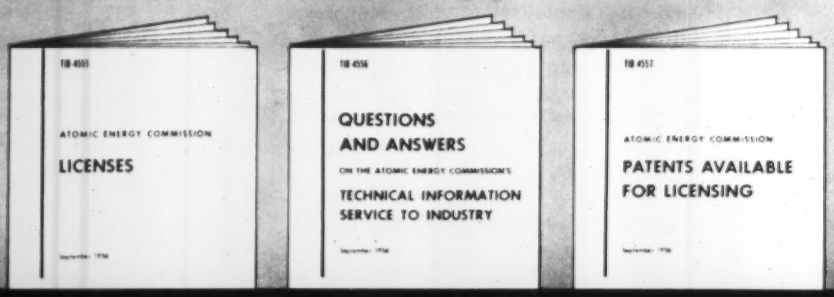
The recent survey on growth prospects for the atomic industry by the Atomic Industrial Forum (New York) shows that by 1964 cumulative spending by industry and government for nuclear development may total $7.5 billion.

The survey predicts that by 1965 industry alone may be spending over $2 billion a year on atomic energy for constructive purposes. This is more than the railroads and the entire mining industry spent (about $1.8 billion) on new plants and equipment in 1955. The government will probably spend an equal amount for weapons and military developments.

Forum people say events since the survey was completed make them believe their projections are conservative. Money spent by industry and government on atomic

AEC Has Answers to Your Questions on Atomics . . .

These booklets will help you set up your program. The Technical Information Service, Atomic Energy Commission, Washington 25, D. C., brought them out in September.



energy may get into the $5 billion a year range by the middle 1960s, STEEL estimates.

Big Part—A good slice of this will be spent for metalworking products.

For example, the survey estimates more than $700 million worth of components for reactor plants will be made annually by 1963. Products include reactor vessels, control apparatus, heat exchangers, pumps, piping, valves, fittings, tanks, instruments and handling equipment.

Making fuel elements—the heat source of a reactor—gets deep into metallurgy and is one of the most promising businesses for metalworking companies. Sales here may reach $200 million to $300 million a year in the early 1960s.

There is also great opportunity for producers of metals and materials to develop special markets.

Getting Started

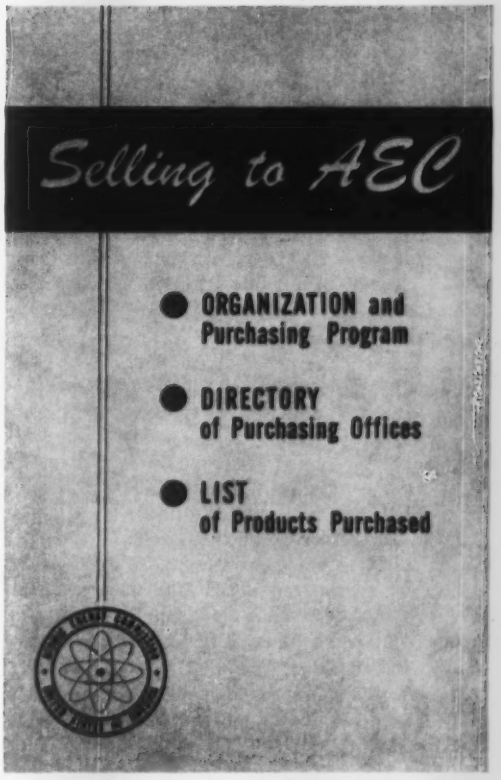
The first step for a company that wants to get atomic business is to get someone close to management who understands the principles and problems involved.

This might be done by hiring an outsider who has experience in atomic energy — especially acquaintance with who's doing what.

Another way is to select an employee (you may need more than one) who has a sound knowledge of your products and facilities. Free him from all other assignments and make it his responsibility to really learn the business.

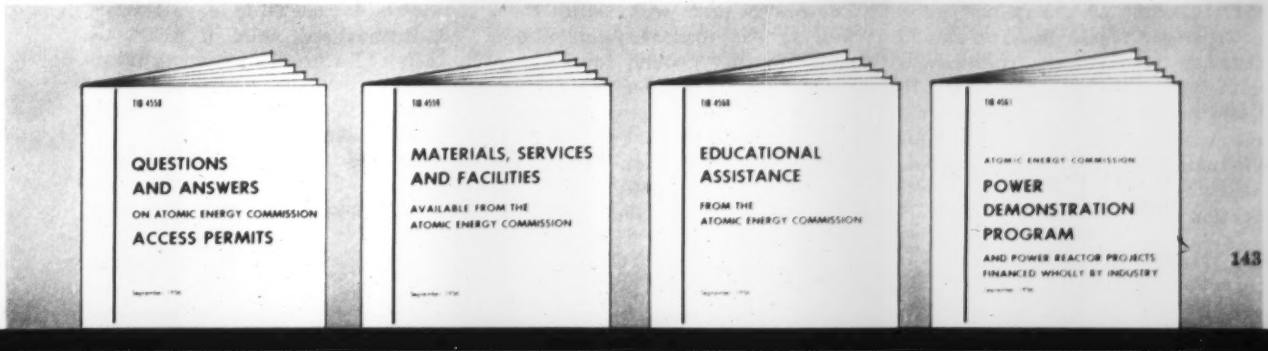
Education—He can get help at the start on the business and technical aspects from consultants. He may want to take a university course and attend one of several AEC schools maintained for industry education. He can get information on AEC training schools by

This booklet can help you get AEC business. Copies can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C. Cost: 25 cents



42 Products the AEC Buys . . .

1. Agricultural implements.
2. Air conditioning equipment.
3. Assay laboratory equipment, supplies.
4. Blowers.
5. Boilers and allied equipment.
6. Brushes, all kinds.
7. Castings.
8. Chemical laboratory equipment.
9. Chemicals.
10. Protective clothing—helmets, goggles.
11. Coal.
12. Communications equipment, supplies.
13. Compressors.
14. Construction equipment and materials.
15. Conveyor equipment.
16. Cranes.
17. Electric equipment.
18. Electronics equipment and instruments.
19. Elevators.
20. Fans.
21. Fencing.
22. Fire fighting equipment and supplies.
23. Furnaces and supplies.
24. Heat transfer equipment.
25. Insulation and refractories.
26. Lighting equipment.
27. Machine tools and accessories.
28. Material handling equipment.
29. Metals—ferrous and nonferrous.
30. Metals—precious.
31. Mining machinery.
32. Oils and greases.
33. Pipe—all kinds.
34. Pumps.
35. Railroad equipment.
36. Rubber clothing and gaskets.
37. Tanks—all kinds.
38. Tools—hand, power and portable.
39. Valves.
40. Welding equipment and supplies.
41. Wire cloth.
42. X-ray equipment and supplies.


QUESTIONS AND ANSWERS
ON ATOMIC ENERGY COMMISSION ACCESS PERMITS
MATERIALS, SERVICES AND FACILITIES
AVAILABLE FROM THE ATOMIC ENERGY COMMISSION
EDUCATIONAL ASSISTANCE
FROM THE ATOMIC ENERGY COMMISSION
ATOMIC ENERGY COMMISSION
POWER DEMONSTRATION PROGRAM
AND POWER REACTOR PROJECTS FINANCED WHOLLY BY INDUSTRY

Available Unclassified Information . . .

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.
IDT:ELD
To: METALWORKING U.S.A.
Gentlemen:
Now that you are a participant in the Civilian Applications Program, we believe that you will be interested in acquainting yourself and your staff with the ways and means of learning about the results of AEC research and development programs.
This letter and enclosures deal entirely with what's available in the AEC unclassified literature (and where you find it). A second letter covering AEC classified information available under your access permit will be mailed as soon as your staff and physical facilities are approved for using and safeguarding Restricted Data.
The vast amount of research and development initiated by the Commission is probably only a significant beginning in the technological advancement of the atomic energy industry of tomorrow. We, in the Technical Information Service, as well as others here in the Operations Offices, are ready to assist you in your search for technical information related to the civilian applications of atomic energy.
Sincerely yours,
Bernard M. Fry
Ass't. Director for
Technical Information Service
Enclosures:
What's Available in AE Unclassified Literature
Nuclear Science Abstracts (sample copy)
OTS Price List No. 25
Atomic Energy Publications Recently Released (GPO)
TID-4000
Electric Power Production
Professional-Level File List
UN Conference Papers; Price List 1
Report Announcement Bulletins (Unclassified)
UNCLASSIFIED
REPORT ANNOUNCEMENT BULLETIN
Unclassified Reports for Civilian Applications
UNITED NATIONS CONFERENCE PAPERS
UNCLASSIFIED
Cumulated Numerical List of Available Unclassified U.S. Atomic Energy Commission Reports
Nuclear Science Abstracts
SELECTED READINGS ON
Atomic Energy
United States Atomic Energy Commission
ATOMIC ENERGY COMMISSION RESEARCH REPORTS
What's Available
IN THE UNCLASSIFIED
ATOMIC ENERGY
LITERATURE AND
Where you find it

This letter introduces you to unclassified information you can get through the AEC's civilian application program

contacting the AEC at Oak Ridge, Tenn., or the Argonne National Laboratory, Lemont, Ill.

The AEC provides training in another way. Industrial firms "lend" scientists and engineers to AEC plants and laboratories for specified periods—usually a year. During this assignment, the employee works on the problems at hand and acquires a lot of specialized experience to take back to his company.

Your atomic specialist should visit AEC installations and other atomic operations. As he studies and talks with people working in atomics, he will pick up a feeling for the scope of the field.

Organized Meetings—You should schedule management conferences with your atomic specialist. In these meetings you can study his recommendations, analyze your products and facilities for atomic applications or discuss the production of a new item.

One of the first moves in your program should be to get acquainted with AEC. Its plants and laboratories are operated under contract by industrial concerns and academic organizations.

This contractual method of operation was established by the Army's Manhattan Engineer District, the predecessor of the AEC. It worked so well in producing the atomic bomb that AEC decided at the outset to continue to use the managerial and technical resources of industry for research, development and production.

Benefits Here—Industrial firms working in AEC's program gain know-how that will serve them well in the nuclear field. It's a good training ground for employees and gives prestige.

The AEC is a large purchaser of goods and services. During the 1956 fiscal year, it spent $1.6 billion. This went mostly for the design, construction and operation of plants, laboratories and other facilities, plus research and development.

Most of the purchasing is done by the AEC's prime contractors. They follow business practices in placing subcontracts and purchase orders. To help prospective suppliers, the AEC has published a booklet, "Selling to AEC" (see page 143). It lists purchasing offices and products they buy.

Information Channels

You really won't know where you stand and what you can do until you look over the available information. "Much of what you need is unclassified," says Edward J. Brunenkant, chief of AEC's Industrial Information Branch, Washington.

Over 9000 articles describing AEC-sponsored work have appeared in scientific and technical journals. The AEC also has released over 17,000 unclassified

technical reports. Some 10,000 of the most useful may be purchased from the AEC's sales agent for unclassified reports, the Office of Technical Services, Department of Commerce, Washington 25, D. C.

Literature Rundown—Your key to unclassified reports and literature is the AEC's abstract journal, *Nuclear Science Abstracts*. Issued semi-monthly, it may be purchased for $6 a year from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.

To encourage the use of scientific and technical literature generated in the AEC and its contractors, 50 libraries have been set up as official depositories.

More detailed information on the availability of unclassified atomic literature is found in a question-and-answer booklet published by the AEC: "A Businessman Asks . . . How Can I Keep Up with Atomic Energy Developments?" It also contains a list of AEC depository libraries. It's available free from the Industrial Information Branch, U.S. Atomic Energy Commission, Washington 25, D. C.

Classified Information

Industry can also get classified information and gain access to classified facilities used for atomic energy.

Working from the Atomic Energy Act of 1954, AEC initiated a program in 1955 to give industry classified information which it may use for private purposes.

This program is built around the issuance of so-called "Access Permits." More than 1000 have been issued. Any domestic firm or U.S. citizen may apply. Applicants must pass security clearances.

Types—There are two classes of permits—those for confidential and those for secret information. You can obtain forms from: Division of Civilian Application, U.S. Atomic Energy Commission, Washington 25, D. C. There is no charge for the first 25 issued.

Your access permit gives you the right to see confidential and secret documents, attend classified conferences, visit installations where classified work is carried out and exchange secret information with other permit holders.

These contacts are a big help in developing atomic business.

Case in Point—For example, on Sept. 13 the AEC held a classified meeting at Oak Ridge at which opportunities for industrial participation in uranium scrap recovery were discussed. It was open only to access permit holders.

The AEC would like private industry to take over the job of scrap recovery. About profit possibilities it has this to say: "Scrap recovery represents a definite area to be investigated aggressively because of its profit making possibilities in the short term as well as the long term growth potential for companies that act promptly."

What's the incentive?

It's estimated that $2.4 billion worth of scrap will flow through processing plants in 1975.

Steps To Take — Suppose you wanted to get into scrap recovery. How would you go about it?

You should get an access permit for secret information, get your people cleared and get set to receive classified information.

Arrange for your technical team to talk with companies manufacturing fuel elements, such as Babcock & Wilcox Co., New York, and Sylvania Electric Co., New York, to get a picture of the amount and type of materials being handled now and what's expected in the future.

You should attend all AEC meetings on this subject (such as the one at Oak Ridge). Your team can get first-hand information on such points as facilities needed.

Available Classified Information . . .

FORM AEC-278
(11-55)

Budget Bureau No. 38-R073.1
Approval Expires November 30, 1957

U. S. Atomic Energy Commission
Washington 25, D. C.

APPLICATION FOR ACCESS PERMIT

(File in triplicate. Use continuation sheets as necessary)

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 25, application is hereby made for an Access Permit for restricted Data relating to the civilian uses of atomic energy.

1. Name (Use full name of applicant to whom Access Permit is to be issued)

2. Principal business address:

3. Describe business or occupation:

Your access permit opens the door to confidential and secret information. As soon as AEC's Technical Information Service (TIS), Oak Ridge, Tenn., gets word that facility clearance has been established for a company holding an access permit under the civilian application program, it sends lists of material available and order forms for the classified documents needed. Here's a rundown on what's included:

1. *Civilian Application of Atomic Energy (CAAE)*—This is the key to confidential research information. It contains abstracts of all currently issued AEC reports which are classified confidential. It also includes abstracts of all reports which have been downgraded from secret. A monthly *CAAE* is distributed without charge.

2. *Abstracts of Classified Reports (ACR)*—This is the key to secret research information. Issued semi-monthly, it contains abstracts of AEC classified reports and pertinent domestic and foreign nuclear science reports which are classified. Holders of access permits get *ACR* without charge.

3. *Nuclear Science and Technology (NST)*—This is a bimonthly journal of classified research and development papers, including review articles and articles reporting new results and ideas.

4. *Geneva Conference Papers* — About 1100 papers were prepared for this Conference. Although they are not classified, they are available through the same channels as classified reports. Those wanted can be purchased for 5 cents a copy.

DAGE
TELEVISION DIVISION of
Thompson Products
A LOGICAL SOURCE FOR NUCLEAR COMPONENTS
HEAT RESISTANT • HYDRAULIC • PNEUMATIC • ELECTRONIC

Industrial exhibits help a company to establish itself in the atomic energy field. Shown above is the booth used by Thompson Products' Nuclear Products Department at the International Atomic Exposition in Cleveland last December

manpower requirements, costs and process technology.

Analyze Possibilities

With someone close to your management level who is on speaking terms with atomic energy needs and developments, you'll want to study your business potentials in several areas.

Look at your products first. Are they useful in some phase of the atomic industry?

Integration—Perhaps atomics are a natural for your present line. Take the case of Babcock & Wilcox Co., which is starting up a fuel element plant at Lynchburg, Va. B&W's business is the design and manufacture of complete steam generating units.

Fissionable material is the newest type of fuel to become available. If it's capable of carrying a portion of the nation's power load, B&W must be prepared to supply the necessary equipment or lose a piece of its business.

Here's an example of another company studying its products for atomic applications. A few weeks ago, Buffalo Forge Co., Buffalo, was granted an access permit by the AEC. The company says it needs the information to develop new methods of ventilation for radioactive areas and to investigate pumps for atomic reactors used in tracer techniques.

Diversification — But if there's no obvious tie-in with your business, don't overlook the opportunity to diversify. You may come up with an engineered atomic item that your salesmen can sell.

The Budd Co., Philadelphia, recently established a Nuclear Systems Division to turn out industrial radiography equipment for inspection of heavy castings, weldments and fabricated parts. It's based on the production of a versatile line of remote handling equipment for safe exposure of very strong gamma sources.

The fact that there are problems aplenty will lend encouragement to your diversification efforts. Keep in mind that the theoretical side of nuclear energy is far ahead of the practical. Ideas pay off just as well as they do in your regular business.

There's plenty of room for subcontractors, too. Prime suppliers must call upon subcontractors because of the complexity of atomic jobs. Subcontractors selected are those who have (or are willing to) put money into development.

Tell Your Story

Don't forget to promote your potential atomic products and services. Give your salesmen literature they can use.

"The first job of an atomic specialist is to identify his company's capabilities with atomic energy," says Harry L. Browne, in describing his job as manager of the new Nuclear Products Department at Thompson Products Inc., Cleveland.

Top of List—Mr. Browne puts personal contacts with companies doing atomic work on submarines, ships, aircraft and power plants, for example, as the most important first step to take in getting atomic business. He also has literature to show that Thompson is qualified to take on atomic business along such lines as: Quick disconnect valve couplings; reactor control rod mechanisms and regulation systems, liquid metal pumps; mechanical and electronic weapon and propulsion components.

Superior Tube Co., Norristown, Pa., has been supplying tubing for about ten years. On July 1, it announced it had formed its Nuclear Products Division to handle atomic activities.

Trade Shows — To promote its atomic products, Superior exhibited 63 standard and 32 special tubing analyses at the Trade Fair of the Atomic Industry at Chicago in September. It displayed pieces of zirconium alloy tubing for reactor use.

Literature which Superior handed out described the products and facilities of its Nuclear Products Division. Six reports on tubing for atomic power were distributed.

Others — Lukens Steel Co., Coatesville, Pa., has prepared a report for its salesmen telling how its clad steels can be used in nuclear reactors.

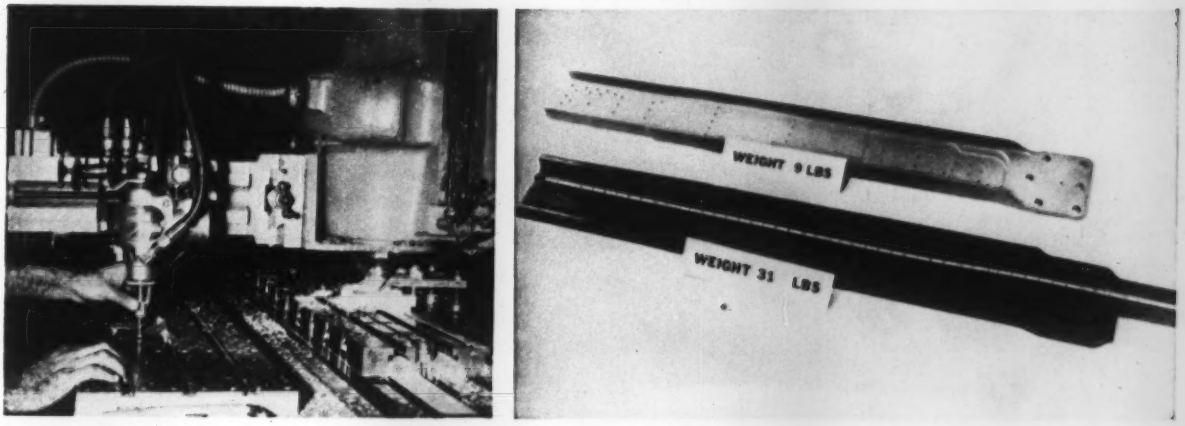
In the Aug. 6 issue of STEEL, G. O. Carlson Inc., Thorndale, Pa., had a double page ad which told about the 19 tons of 304 stainless plate it sold to one customer for atomic power use.

Towmotor Corp., Cleveland, featured a lead story in its house organ, *Handling Materials Illustrated*, which tells how its fork lift trucks simplify the handling of atomic wastes.

In planning your atomic business, keep in mind that you must put as much emphasis on the promotion of these goods and services as you do your regular lines.

Don't feel you can't get into the atomic energy business until the AEC puts out a special invitation. Nothing could be farther from the truth. Opportunities are all around you. But you have to supply the initiative and find your niche.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*



This titanium aircraft forging (rough and machined) shows how much metal has to come off. Switch from aluminum to titanium may call for 15 times more capacity to turn out the same number of parts

Aircraft Makers Cite Machine Needs

Contouring machining is standard, but on tomorrow's machines aircraft people want tape controls with standard tape systems, automatic tool selection and changing

"WE ARE on the threshold of a machine tool crisis," says one aircraft production expert. "Aircraft designers now find they are approaching a point where an improvement in design awaits the improvement of machine tools to produce it."

J. H. Famme, assistant chief engineer, Convair, division of General Dynamics Corp., San Diego, Calif., argues that there's not time for simple improvements in machining. "We need a miracle of sorts to overcome incremental metal removal." He cites chemical milling (see next page) as a good example of a brand new solution to an old problem. "This type development is a challenge to machine tool builders and designers and must be seriously considered."

Interim—Meanwhile, machining techniques have to be continually upgraded. Mr. Famme cites tolerances as a critical problem in aircraft because tolerances are translated into weight.

On a bomber with a wing area of 2000 sq ft, gross weight of the skin would jump 5000 lb if the skin were delivered on the high side of tolerances. "This would mean a 50,000 lb increase in weight to cover items like power plant structure and fuel needed to fly that additional 5000 lb at the same speed, range and altitude."

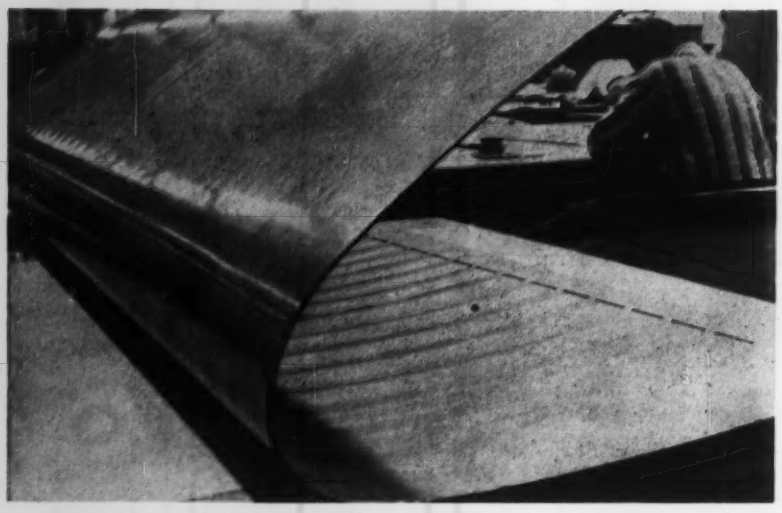
Contouring — To get required tight tolerances automatically, the aircraft industry has embraced contour machining. At the aircraft Contour Machining Conference in Los Angeles, experts told of holding tight tolerances by contouring while cutting job setup time by as much as two-thirds, and reducing (in one case) running time from 7 to 1½-hours. (True-Trace Corp., El Monte, Calif., sponsored the meeting.)

Future—Tomorrow's contouring machines will be tape controlled. R. W. Peters, Convair's chief of tooling, says it will be essential that these machines have "tape compatibility." It must be possible to work with tapes that can be used on many machines by different companies with a minimum of tape and tooling rework.

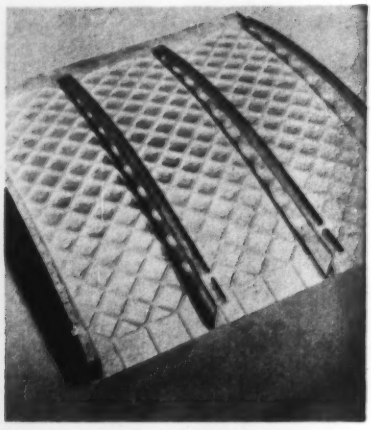
Another requirement for tomorrow's contouring equipment: It will have to be bigger. Anxious to eliminate points of stress concentration, planemakers are getting rid of joints . . . are replacing assemblies of small parts with huge one-piece forgings.

Mr. Peters predicts Convair will be using stainless steel skins ⅜-in. thick, 6 ft wide and up to 50 ft long. They will have to be contour sculptured after forming.

Charles Morlath, industrial engineer at North American Aviation Inc., Downey, Calif., says tape controlled units will have to be able to eject used cutters into a file, then select a new cutter from the file for the next operation. He also feels the machine will have to be self-adjusting to compensate for new cutter shapes and sizes.



This wing leading edge is chemically milled at Convair, division of General Dynamics Corp., San Diego, Calif.



Intricate celled pattern shows on integrally stiffened skin. Convair does this operation with chemical milling. Machining time is cut drastically. Depth of cut is held to ±0.002 in.

Chem-Milling: A Progress Report

This expert says "it is an invaluable process" with "innumerable possibilities." Here's how he's using it—also some points to watch in applying masking compound

CHEMICAL milling is a regular on the aircraft production team. Developed by Manuel Sanz, at North American Aviation Co., Downey, Calif., the process removes metal with a controlled etching technique. (See STEEL, May 16, 1955, p. 120.)

At Grumman Aircraft Engineering Corp., Long Island, N. Y., for example, it is used to etch stiffeners in stretched skin. At the recent Contour Machining Conference in Los Angeles, Durward Armstrong, consultant to Grumman's process engineering department, reported his observations on the process:

Tolerances—You can hold the depth of cut to within ±0.002 in. of specified dimensions. He recommends that over-all dimensions shouldn't be figured closer than ±1/32-in.

Grain structure of aluminum plate must be taken into account where the cut enters or passes through the center area. He recommends that empirical curves, based on test cuts, be established before you try to make predictions on etch rate or surface finish.

Procedure — At Grumman, the first step in chem-milling is a thorough cleaning of the surface with a nonetchant, alkaline cleaner. Following drying, the parts are dipped in a masking compound, which coats them with a layer of mask 0.008 to 0.010 in. thick. The mask is dried until it's no longer tacky. Then it's cured at 200°F for 1 hour.

The template or pattern is placed over the part and scribed. "Care must be taken," Mr. Armstrong warns, "not to scratch the base material in any areas to be etched." After scribing, the mask is peeled away from areas to be etched, and the part is immersed in the etchant. Time in the etchant depends on the desired depth of cut.

Finally, the mask is removed from the finished part, and it's deoxidized to remove the smut and to passivate the surface.

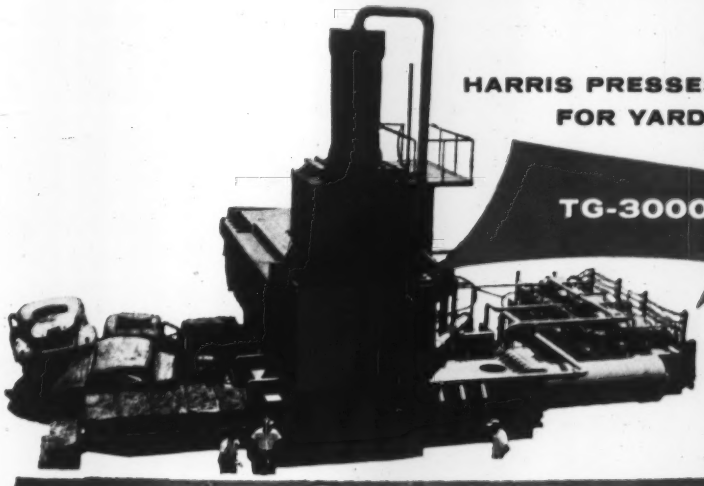
Problem — Mr. Armstrong says a prime problem in chem-milling centers in the masking materials and their application. The dip method is expensive, he feels, and a satisfactory flow-coating method is needed.

He feels that the properties of the masking materials should be improved, particularly adhesiveness and cohesiveness. He says: "Criteria for a good masking compound would incorporate sufficient adhesive strength to prevent the etchant from lifting the compound at the exposed interfaces, and cohesive strength sufficient to permit release via peeling.

He continues: "The adhesive strength should remain fairly constant. Masking compounds have a tendency to be more difficult to peel upon aging, and this constitutes a real disadvantage." The compounds tear during peeling, or they are on so tight, they must be removed chemically.

if you have
baling troubles or ambitions
get in touch with HARRIS

HARRIS PRESSES ARE MAKING MONEY FOR YARDS IN THESE LOCATIONS . . .



TG-3000

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Louisville, Kentucky
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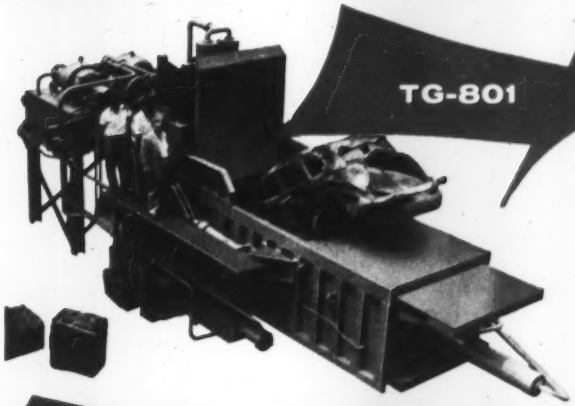
Morrisville, Pennsylvania
Ashland, Kentucky
Pittsburgh, Pennsylvania
Detroit, Michigan
Davenport, Iowa



TG-801

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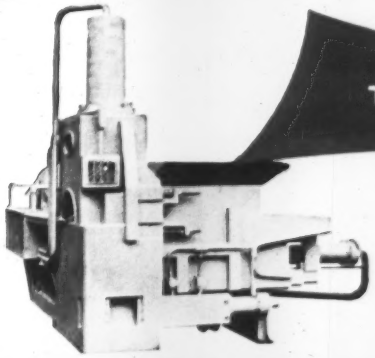

TG-50

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East Chicago, Indiana
Baltimore, Maryland
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SEE HARRIS PRESSES ON LOCATION

TALK WITH A MAN FROM HARRIS

HARRIS FOUNDRY & MACHINE CO.
Reclamation Engineers Since 1889
CORDELE, GEORGIA

Table 1—How the Charge Affects Wind Rate and Production

	Chemical Improvements		Physical Improvements			Wind Rate	Production
Year	Slag Volume lb per net ton	Coke Ash per cent	Coke Stability per cent	Sinter in Burden per cent	Sized Ore per cent	Wind Blown cfm per furnace	Daily Production net tons
1947	1020	10.32	44.3	6.7	1.9	58,298	7350
1948	1110	10.32	44.3	6.2	2.8	59,984	7435
1949	1110	9.32	47.0	5.4	3.4	58,885	7546
1950	1068	7.78	49.7	6.7	3.2	57,450	7340
1951	1095	6.24	50.0	5.0	3.4	61,800	7741
1952	1031	6.39	48.0	6.6	2.5	61,061	7974
1953	1038	6.12	51.6	9.7	1.4	65,599	7957
1954*	—	—	52.7	8.9	3.3	—	—
1955	994	6.24	53.1	11.8	2.9	67,076	8581
1956**	934	6.37	—	—	—	—	8600

*One furnace not operating.
**First four months of 1956.

Figures are for Inland Steel Co. blast furnaces only.

Part I. - Lowering the Coke Rate

More Iron Without More Furnaces

A strong plea for more efficient use of our blast furnaces was made at the recent Chicago Regional Technical Meeting of American Iron & Steel Institute

By CHARLES M. SQUARCY
Superintendent
Blast Furnace Department
Inland Steel Co.
East Chicago, Ind.

RICHARD J. WILSON
Assistant Superintendent, Plant 2
Blast Furnace Department
Inland Steel Co.
East Chicago, Ind.

WHY BUILD new blast furnaces if production of existing units can be increased? If the need for expensive new capital equipment can be avoided, perhaps conversion costs on present units can also be reduced.

Such is the reasoning of Inland Steel Co.

Before constructing new furnaces, Inland considers these six alternatives:

1. Beneficiation of ores (including sizing and agglomeration).
2. Use of better coke from washed coal.
3. High top pressure operations.
4. Introduction of steam into the blast.
5. Introduction of oxygen into the blast.
6. Preheating the blast above conventional temperatures.

These alternatives can operate to increase blast furnace production two ways:

1. By lowering the coke rate.
2. By increasing the driving rate.

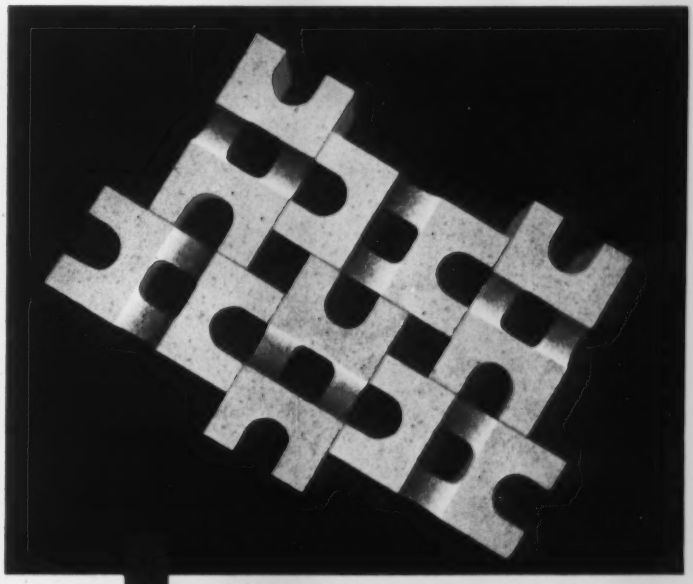
Reasoning—The coke rate can be lowered by improving the raw materials. Improving their chemical properties means using lower slag volume ores and lower ash coke. Improving their physical properties means using sized ore, sinter and stronger coke.

Lower slag volume ores and lower ash coke increase production by decreasing the hearth heat requirements for coke and, thus, the coke rate. The use of sized ore, sinter and stronger coke increases production by promoting more uniform distribution in the shaft of the furnace. The result is more efficient

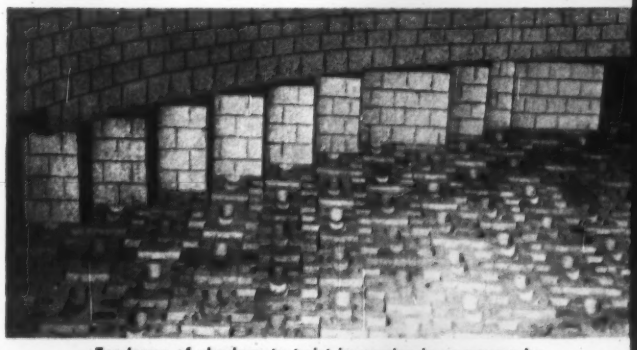
New design provides

25% to 50% GREATER HEATING SURFACE

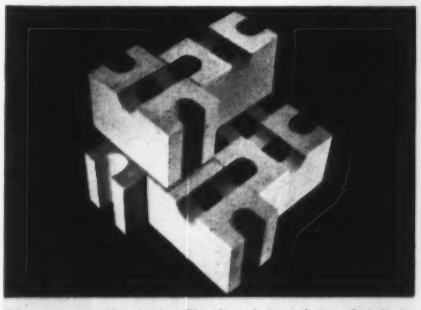
than ordinary basket weave checkers



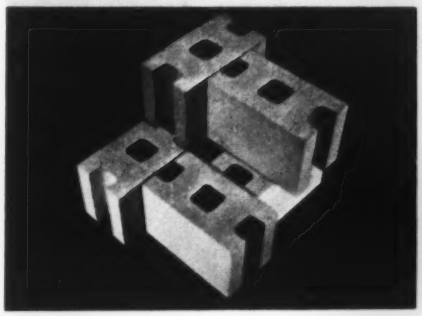
KENNEDY BLAST FURNACE STOVE CHECKERS



Tendency of checkers to twist in service is overcome by pilaster wall construction of the Bailey Hot Blast Stove.



The regular Kennedy Checker (above) is of 3-hole design with unobstructed flue openings, 1¼" minimum wall thickness and a cross flue. It also can be furnished (below) without the cross flue feature.



This new 3-hole checker shape is laid in basket weave style to produce a solid 1¼" wall between each flue. This assures greatly increased heating surface without sacrificing the advantages of basket weave design.

The increased heating surface of the Kennedy Checker results in a correspondingly lower stack temperature. This makes possible the use of a modern steel bottom for supporting the checker system.

Write for Bulletin

WILLIAM M. **Bailey** COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

Table 2.—Effect of Sized Ore on Production

	Sized Ore per cent	Production net tons per day	Coke Rate lb per net ton	Wind Rate cfm	Slag Volume lb per net ton	Tonnage Increase per cent
NO. 5 FURNACE*						
Jan., 1956	16	1415	1631	80,247	937	
Feb., 1956	0	1254	1661	75,834	948	
Difference		+161	− 30	+4413	− 11	12.8
NO. 6 FURNACE*						
Jan., 1956	0	1246	1684	73,642	894	
Feb., 1956	16	1378	1573	79,459	928	
Difference		+132	−111	+5817	+ 34	10.6

Table 3.—Effect of Charging Method on Production

	Sized Ore per cent	Production net tons per day	Coke Rate lb per net ton	Wind Rate cfm	Slag Volume lb per net ton	Tonnage Increase per cent
NO. 5 FURNACE*						
Mar., 1956	10	1366	1639	79,823	906	
Apr., 1956	8	1452	1555	81,231	811	
Difference		+ 86	− 84	+1408	− 95	6.3
NO. 6 FURNACE*						
Mar., 1956	6	1294	1647	77,656	915	
Apr., 1956	8	1398	1570	81,056	814	
Difference		+104	− 77	+3400	−101	8.0

*Both No. 5 and No. 6 furnaces have 25 ft 9 in. hearths.

PROGRESS . . .

gas-solid contact and better preparation of raw materials before they enter the hearth. Less coke is needed to complete the reduction of the iron ore and to increase the sensible heat in the raw materials before melting and superheating take place.

Increasing the driving rate means burning more coke per unit time by blowing higher wind volumes, or through the use of enriched blast. This presupposes that there are sufficient voids in the stack to allow smooth passage of the gas.

If and But—Neither alternative guarantees improved production. Production will be increased only when the hearth heat requirements for coke continue to control the coke rate and when these requirements either decrease, stay the same or increase by a smaller percentage than the driving rate.

For example, the slag volume of a burden may be reduced by substituting one ore for another. The physical properties of the lower slag volume ore may be inferior to the other, necessitating wind reductions on the furnace. Although the coke rate will be reduced, the driving rate of the furnace may be decreased by a greater percentage. Then production will decrease.

In another case, the driving rate may be increased, but the result

Table 4—Benefits from a High Sinter Burden

Per Cent Sinter Charged	Per Cent Increase in Iron Production	Per Cent Decrease in Coke Consumption
10	2.1 to 8.2	3.0 to 8.0
20	4.1 to 14.3	5.5 to 13.0
30	5.5 to 17.5	7.7 to 16.0
40	6.8 to 19.8	9.0 to 18.0
50	7.1 to 20.4	9.8 to 20.0
60 and over	7.1 to 20.4	10.0 to 21.0

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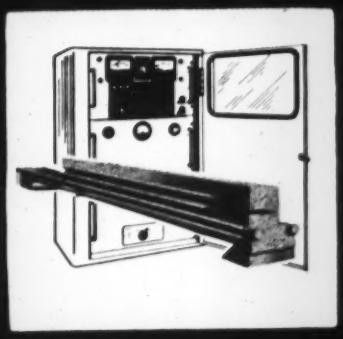

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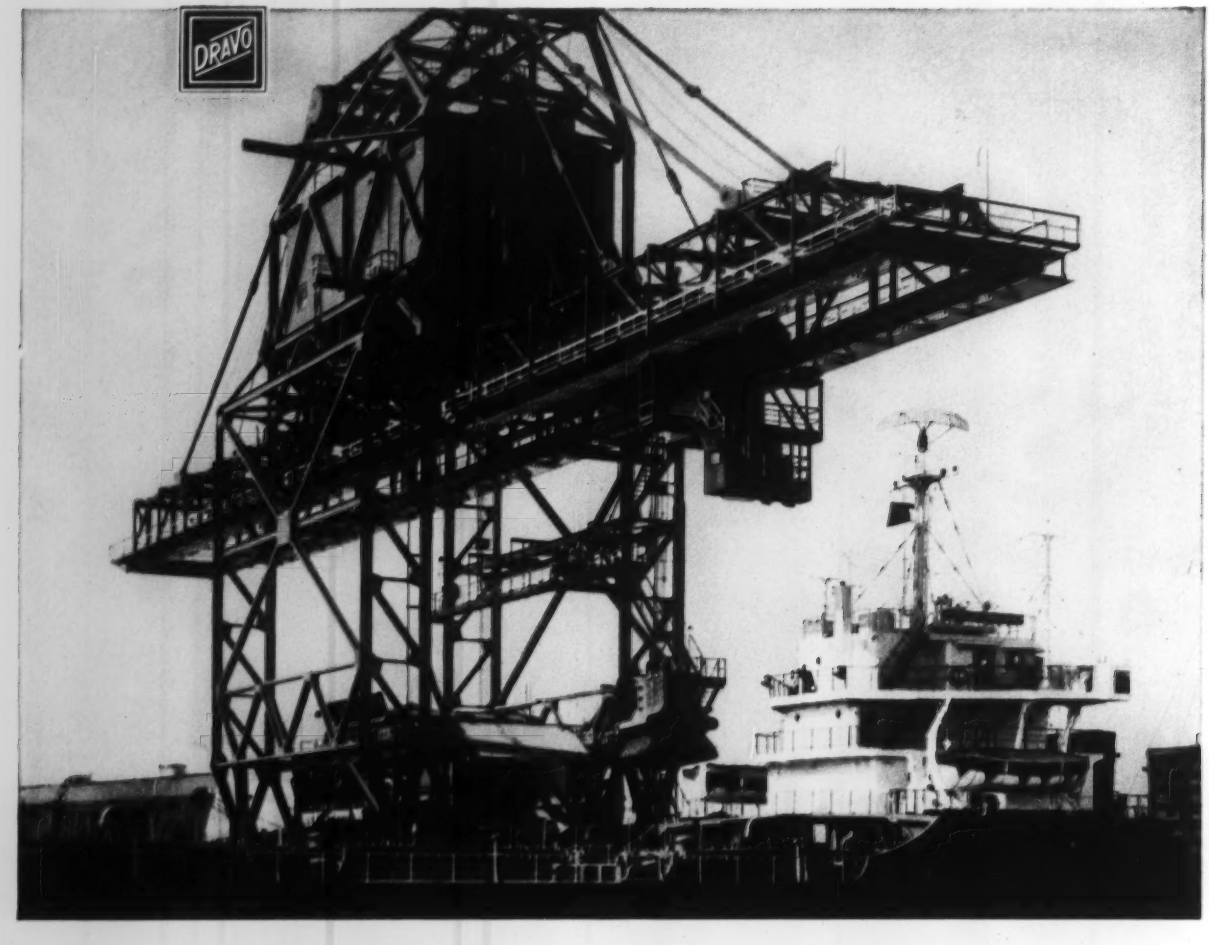

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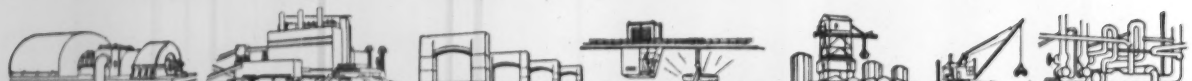

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may be overblowing, with an increase in flue dust and decrease in heat transfer in the stack. In this case, the coke rate increases a higher percentage than the driving rate and production decreases.

Interdependent—When considering methods of increasing blast furnace production, the effect on the coke rate must be ascertained. It is controlled by the hearth heat requirements. These consist of the heat needed to melt and superheat the iron and slag, and to preheat and perform the final reduction of the raw materials.

The amount of slag that is formed per ton of iron produced is based on the chemistry of the raw materials—the greater the amount of slag produced, the higher the coke requirements. The amount of preheating and final reduction to be accomplished in the hearth is a function of the gas-solid contact in the shaft. The more intimate this contact is, the lower the heat requirements for coke.

If the coke rate of a given furnace is high because of poor gas flow, then the greatest improvement in tonnage will be attained by charging raw materials that promote more uniform and intimate gas-solid contact. Such materials might include higher stability coke, sized ore or sinter. Attempts to improve production by charging lower slag volume raw materials with the same physical characteristics as the former materials would achieve only a modest increase, if any. But, if the physical characteristics of the burden were improved, further increases in production could be attained by charging lower slag volume raw materials, or by increasing the driving rate of the furnace.

Experience—Table 1 shows that the production rate of Inland Steel Co. blast furnaces increased 16.7 per cent in 1955, compared with the 1947 rate, while there was only a decrease of 2.5 per cent in the slag volume. The reduction of coke ash from 10.32 to 6.24 per cent, a drop of 4.08 per cent, should have resulted in a slag volume decrease of approximately 9.8 per cent. However, deterioration of Mesabi ores counteracted this advantage.

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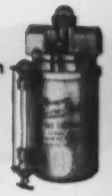

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PROGRESS . . .

properties of the raw materials gives the answer to the increased production. The stability of the coke increased from 44.3 per cent in 1947 to 53.1 per cent in 1955, while the percentage of screened ore and sinter in the burdens increased from a total of 8.6 to 14.7 per cent.

The wind rate increased 15.1 per cent in 1955, compared with that in 1947. This was a result of the physical improvements made in blast furnace raw materials.

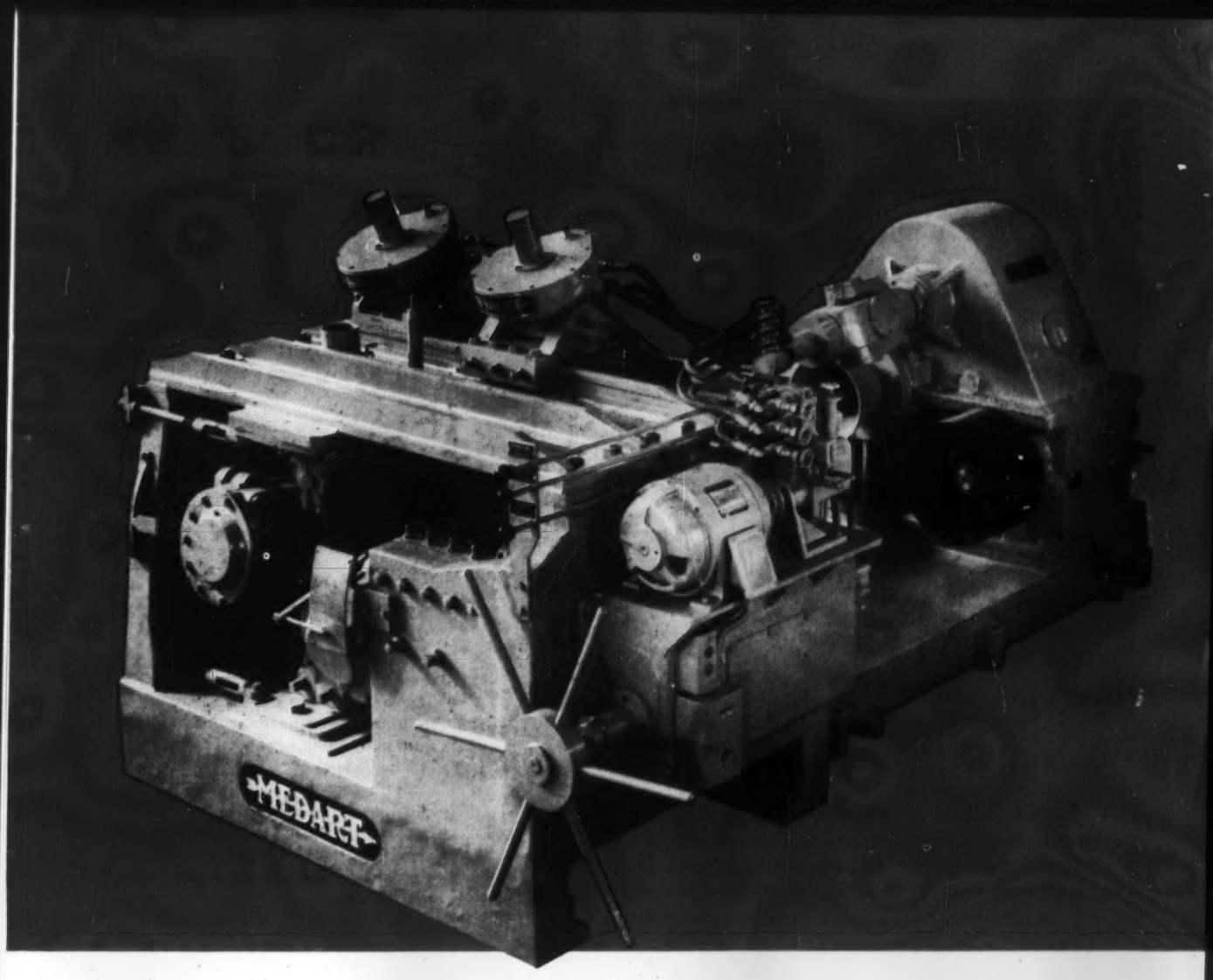
Using the common assumption that a 10 per cent reduction in slag volume results in a 4 per cent increase in production, the chemical improvements provided a 1 per cent increase in production. Assuming that production is directly proportional to wind blown, the physical improvements accounted for 15.1 per cent of the production increase. This leaves 0.6 per cent of the tonnage increase unaccounted for.

Sizing—Inland's eight blast furnaces include one which is 17 ft 3 in. in hearth diameter, one 19 ft, two 20 ft and four 25 ft 9 in. Because larger furnaces require stronger coke to provide sufficient voids for gas flow, the practice of charging the larger furnaces with the highest percentages of sized ore and sinter as well as the best coke was evolved.

Between 1947 and 1955, the production of furnaces increased 23.2 per cent; the slag volume decreased 11.4 per cent; and the wind rate increased 16.1 per cent.

On the smaller furnaces, production increased 14.8 per cent; slag volume decreased 2.3 per cent; and wind rate increased 16.3 per cent. The smaller furnaces increased in production 14.8 per cent over 1947, even though the percentage of sized ore and sinter decreased from 17.5 to 7.3 per cent. Evidently, the improvement in the stability of the coke was sufficient to allow the same increase in wind rate for the smaller furnaces as was attained on the larger furnaces.

Example—The effect of physical improvement of the iron ore on performance of the larger furnaces is illustrated by this case: During January, 1956, sized ore constituted 16 per cent of the



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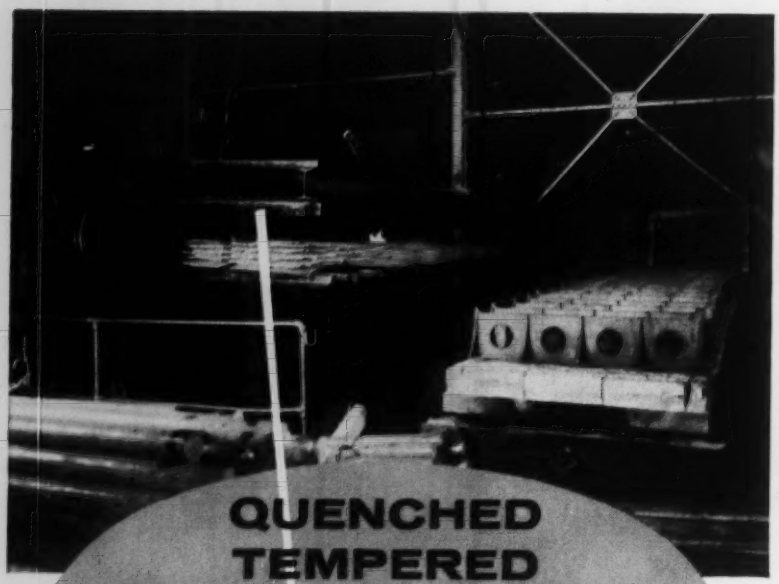

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burden of one 25 ft 9 in. furnace, while no sized ore was charged on another. In February, 1956, the sized ore was taken off the first furnace and put on the other, with the results shown in Table 2.

During both periods, the maximum amount of wind the furnace would take was blown. A tonnage increase of 12.8 per cent on No. 5 furnace was achieved because the sized ore permitted more wind to be blown without increasing the hearth heat requirements. In fact, the reduction in the coke rate of 1.8 per cent indicates a reduction of hearth heat requirements.

The results were duplicated on No. 6 furnace when the sized ore was charged. In this case, the tonnage increase was 10.6 per cent, even though the slag volume of the burden increased 3.9 per cent. Both furnaces needed an improvement in gas-solid contact to reduce the hearth heat requirements. The charging of sized ore resulted in improving the gas-solid contact and in increasing the driving rate of the furnace.

Charging—In March, 1956, the sized ore was divided between the two furnaces. One-half skip of sized ore was charged every third charge and the skip was filled with another ore.

In April, 1956, it was decided to change from a three to a six-cycle filling. This permitted the charging of a full skip of sized ore into each furnace every time it was introduced into the furnace. It was also necessary to replace Mesabi ore with another of lower slag volume. The physical structure of each ore was the same. Table 3 shows the results.

In March, 1956, the tonnage produced on the two furnaces was greater than when no sized ore was charged, but less than when 16 per cent sized ore was charged to each furnace.

In April, 1956, monthly production records were established on both No. 5 and No. 6 furnaces. Some of the higher production could be ascribed to the necessary substitution of the richer Mesabi ore (57 net tons of iron for each furnace is due to the slag volume reduction), but this factor would not have been responsible for so significant an increase. It was the method of charging the sized

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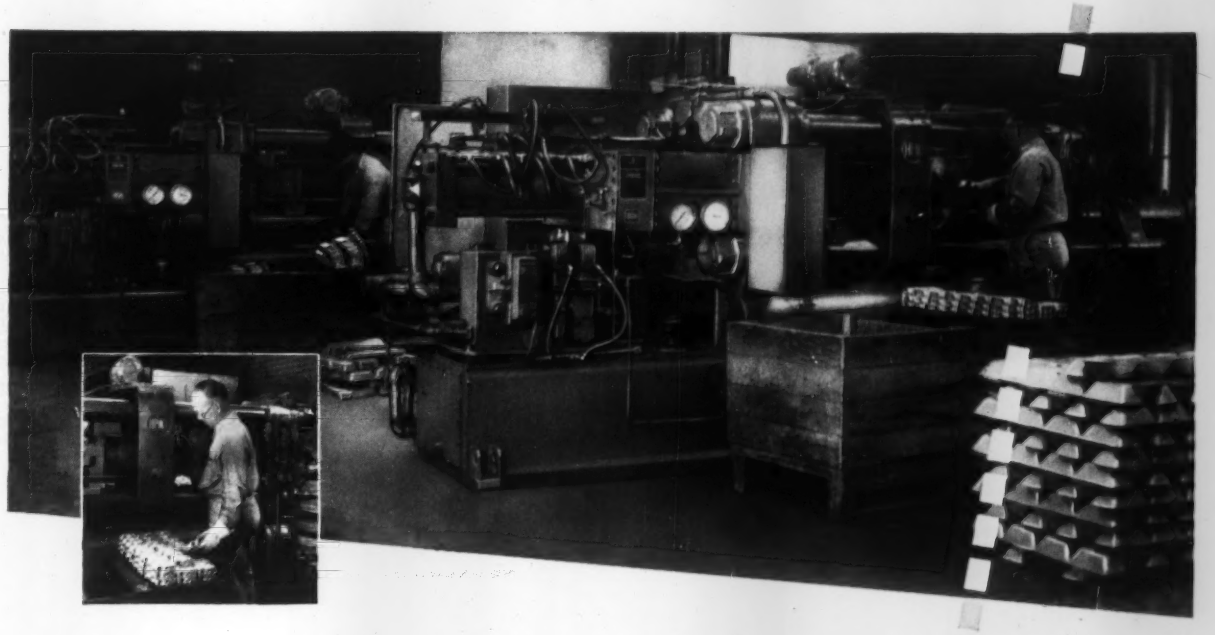

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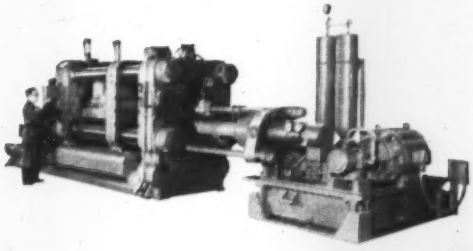

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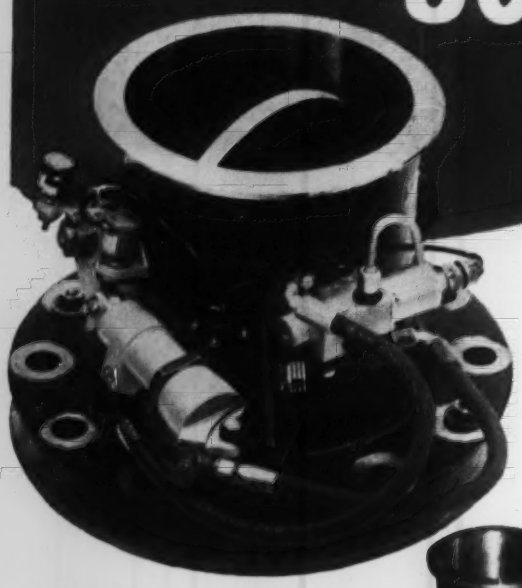

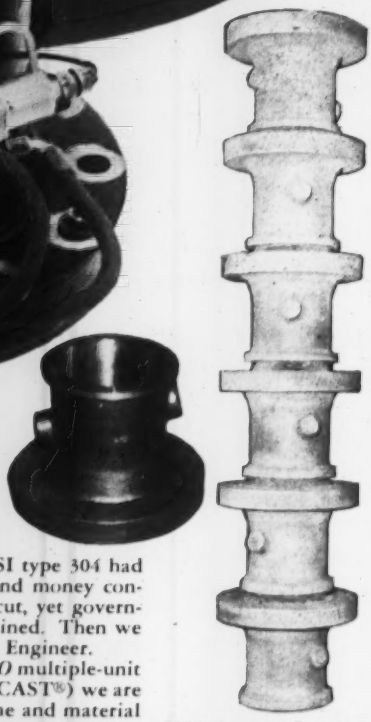

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PROGRESS . . .

ore, not the quantity, which made the difference.

Sinter—G. H. Craig, metallurgist in Inland's research and development department, has compiled figures from a number of companies concerning blast furnace performance with high percentages of sinter in the burden. He has drawn these conclusions:

1. A 9 to 18 per cent decrease in coke consumption may be expected with from 0 to 40 per cent sinter in the burden.

2. A production improvement of 7 to 20 per cent may be attained by increasing the sinter from 0 to 40 per cent.

3. Improvement in coke consumption and production rate above 40 per cent sinter will not be as marked as that up to 30 per cent sinter.

The results of this summary of blast furnace practice with various percentages of sinter are presented in Table 4. The variation illustrated in the table can be easily understood by a study of the other components which make up the burden. Where coke is strong and/or ore is coarse, sinter would be less beneficial. Used with weak coke and/or fine ores, sinter would be more beneficial. This is the reason there is the range in the benefit attained by charging sinter.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O. Part 2 will appear Nov. 26.

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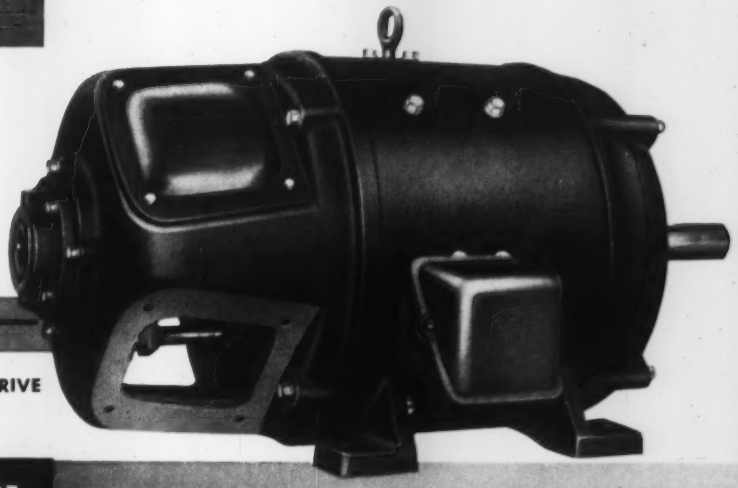

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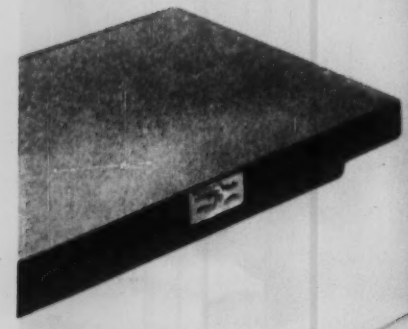

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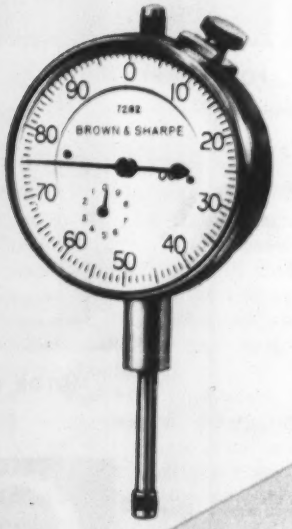

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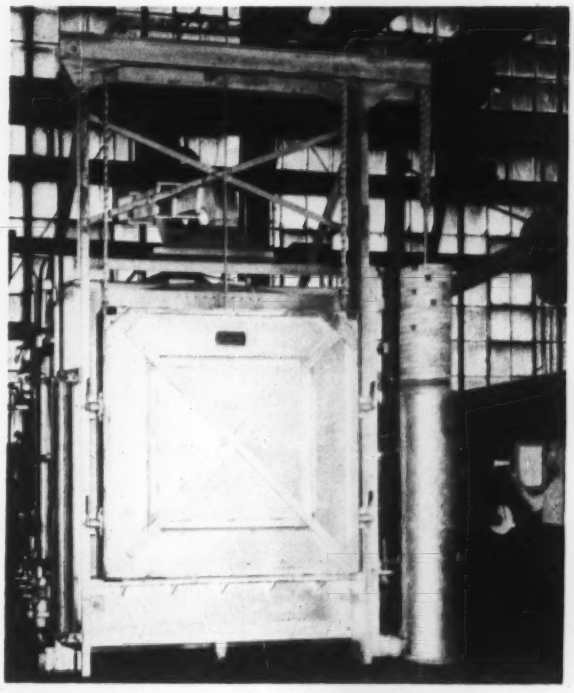
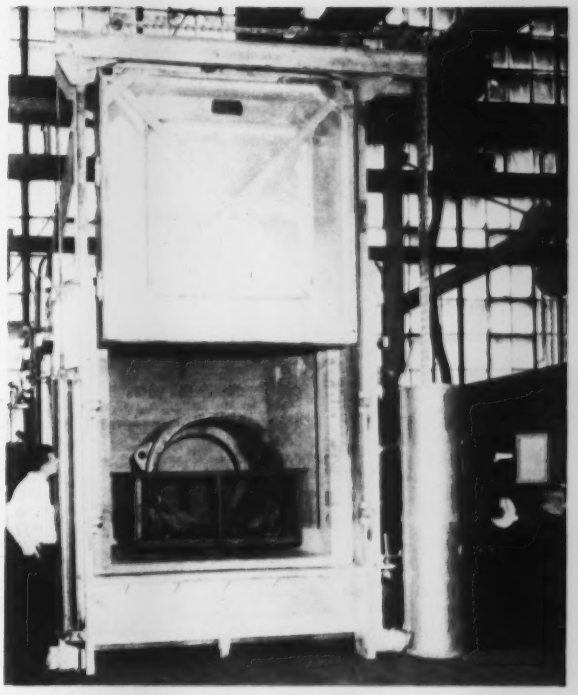


The oven furnace door can be locked tight to prevent infiltration of outside air and to keep furnace gases from leaking out



This large motor frame is considered a small load for the furnace. The door is designed so that a full height load can be placed in the furnace

Automatic Furnace Is Versatile

Reliance Electric's unit has a new firing system and cam-actuated program control. It has solved several difficult heat treating production problems

NEW VERSATILITY has been added to heat treating operations at Reliance Electric & Engineering Co., Cleveland, by a large, flexible oven-type furnace. The firm makes electric motors and controls.

Size and design, a new firing system and a cam-actuated program control allow the furnace to be used for a wide range of processes at varying temperatures. Large and small parts can be handled with equal ease.

Built by Surface Combustion Corp., Toledo, O., the furnace is one of the largest ever shipped as a packaged unit.

By JERE N. HELFAT
Reliance Electric & Engineering Co.
Cleveland

Problems—Reliance installed the unit to solve several heat treating production problems caused by wide differences in the size of parts and the need for different heat treat cycles. To minimize handling of parts within the plant, the company needed a unit small enough to be used adjacent to the production area.

The furnace, including controls, covers a 12 x 12 ft area. Its inside dimensions, 6 x 6 x 6 ft, enable the motor builder to handle large weldments, forgings and castings.

Parts—Shafts 63 in. long are handled in an upright position to prevent warpage. Smaller parts are basket loaded. Typical parts are motor frames, brackets, alloy shafts, spiders and V-rings.

Some parts are treated to refine grain structure for optimum electrical properties. Others, such as large fans, are stress relieved.

Parts are brought from the production area by fork lift truck and loaded directly into the furnace. The furnace's counterbalanced door

The furnace is on the aisle between the production floor and the grit blast room so that it is only another station in the production flow at Reliance Electric. A fork lift truck can bring its load up to the furnace door and deposit it well in the furnace

Heating, holding and cooling cycles are automatic. To change from one to another, it is necessary only to change a cam on the controller

AUTOMATIC FURNACE . . .

is raised and lowered by an air cylinder. The cylinder also cushions the door on closing to prevent it from dropping too fast.

Automatic Cycles—The operating range of the unit is 600 to 2000°F. This lets the company stress relieve at temperatures as low as 600°F and also anneal and normalize well below the maximum operating temperature. Program control has been made possible through the use of Surface Combustion's Conjecto-Firing system which uses twin nozzle burners.

The two nozzles, one above the other, are manifolded to separate sources of fuel and air supply and may be operated individually or together. In the lower temperatures, one nozzle introduces a supply of air which mixes with the hot products of combustion from the second nozzle. This provides a large volume of heated gas which promotes quick and uniform heating through convection.

At higher temperatures, both nozzles fire for faster heating of the load. After the load reaches operating temperature, one nozzle can be cut out and the other used to maintain temperature. For controlled cooling, air again can be introduced through one nozzle.

Programming — By combining the firing system with a cam-actuated recording controller made by the Brown Instrument Division of Minneapolis-Honeywell Regulator Co., Philadelphia, Reliance is able to heat treat automatically.

Typical cycles for a 7500-lb load: To stress relieve, hold furnace at 400°F, heat 2 hours to 1100°F, soak for 2 hours at temperature, control cool for 2 to 3 hours to 600°F. To anneal, hold furnace at 400°F, heat 4 hours to 1550-1575°F, soak 2 hours at temperature, control cool 10 hours to 600°F. To normalize, hold furnace at 400°F, heat 4 hours to 1650°F, soak 2 hours at temperature, control cool 10 hours to 600°F.

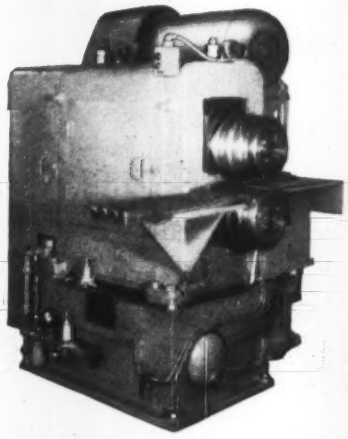
Operation — Reliance is using cams for six different programs. Others will be developed as the need arises. To switch from one program to another requires changing only the cam on the control instrument.

To operate the furnace, it is only necessary to light the pilots, place the load in the furnace, close the door and push the control start button. The furnace automatically heats and cools through the program set by the cam. The furnace will shut itself off at the end of the heat treating cycle.

Design—The furnace's hearth rests on firebrick piers and can support heavy loads under continuous operating conditions. Bottom burners are staggered to fire across and under the hearth from both sides of the furnace into individual crossconnected chambers between the hearth support piers.

Openings between hearth ledges and furnace walls along the sides of the heating chamber aid uniform flow of combustion products. This provides maximum travel for the hot gases and intimate contact with the charge. Flame never impinges on the material being heated.

Burners in the top of the furnace also are staggered on opposite sides. These fire in a line with the furnace arch to prevent impingement on the top of the load.



from the forging roll . . .

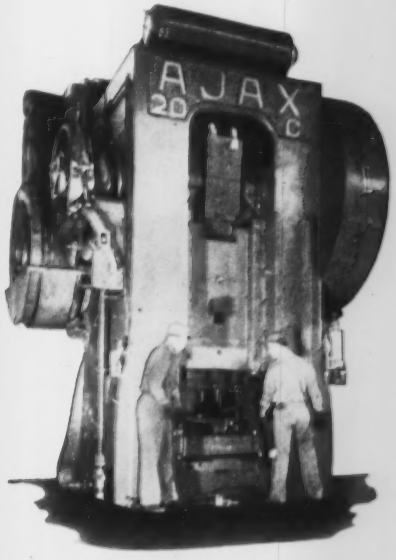
AJAX WIDE ADJUSTMENT FORGING ROLLS

PRE-ROLL YOUR FORGING BLANKS . . .

FOR METAL SAVING • LONGER DIE LIFE • BETTER FIBRE FLOW

AJAX ROLLS are built in seven sizes to pre-roll forging blanks ranging from Connecting Rod blanks to the largest Airplane Propellers. Illustrations show Automobile Connecting Rod blank formed (above) and press-forged (below) on **AJAX HIGH SPEED FORGING PRESS.**

. . . to the forging press



WRITE FOR BULLETIN 91-B

THE **Ajax** MANUFACTURING COMPANY
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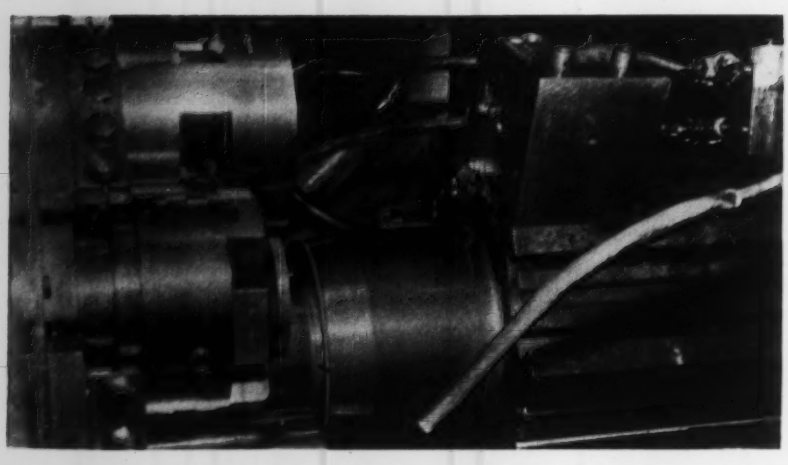
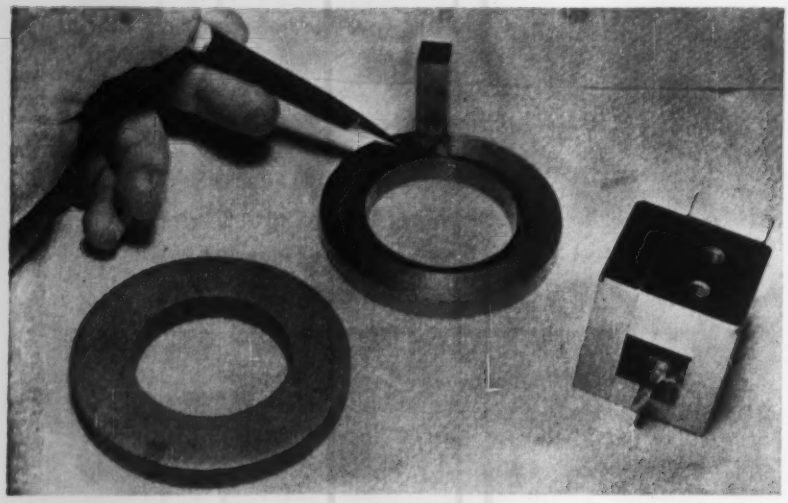


Close-up shows cutting tool tipped with grade 350 carbide (top) protruding from cartridge holder held in main tool block of 8-spindle automatic



Left to right, 1340 steel compressor valve plate in rough condition; finished plate with grooving tool positioned in recess; special cartridge toolholder

Carbide Licks a Tough Cut

LOSING 5 hours a day with tool adjustments on a high-priced 8-spindle automatic is serious enough. But the situation becomes desperate when you also have erratic performance on a critical operation because of low tool life and the "springing" of a thin inside diameter on the work.

General Electric's Commercial & Industrial Air Conditioning plant, Bloomfield, N. J., was having those troubles until a new carbide tool design was introduced, and a unique tool cartridge was developed which applied the tool exactly where it was needed every time.

The Job—Production of a compressor valve plate required for refrigerant valve heads shot up from virtually zero to between 350 and 400 pieces a day. A further increase of about 25 per cent is expected, if the use of leaded steel for the part proves feasible.

The job involves machining a punched out, 1340 annealed steel valve plate on an Acme-Gridley automatic which is cycled every 50 seconds. Operations include rough and finish turning the outside diameter; rough and finish forming the inside diameter; facing both sides of the part; and cutting a groove near the inside diameter of the plate.

Critical Step—The groove was the critical part of the job. Its production required a cut 7/32-in. deep by 0.093-in. wide, leaving a wall thickness of 0.030-in. at the inside diameter of the plate.

All operations on the automatic worked like a charm—except for the grooving operation. During this cut, either the cutting tool gave out quickly or it would "spring" the thin inside diameter wall of the valve plate.

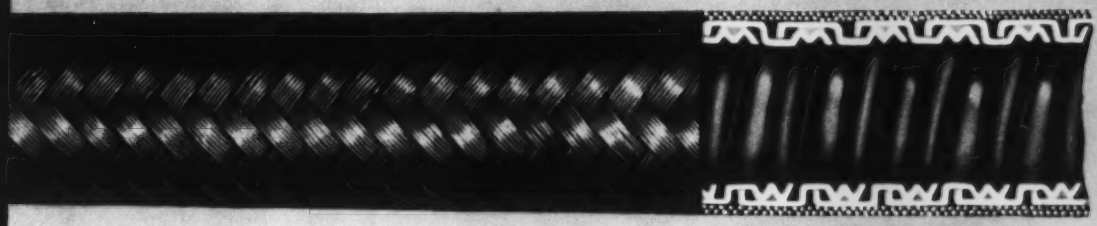
Evolution—Attempts were made to adapt a trepanning tool, as well as an opposed-tool setup, to overcome the problem. Both failed. Frequent tool adjustments were necessary to hold size, since the operation had a tendency to gain size because of minor tool wear.

Two radical approaches finally overcame the problem. One was the use of a carbide tool that combined properties of two Carboloy grades of carbide. The other was designing a cartridge type toolholder which was adapted to the machine's main tool slide.

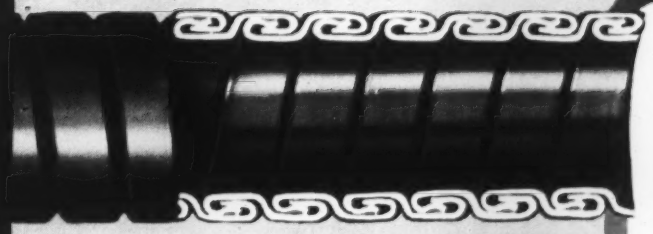
The Tool—The cutting tool is a grade 55A carbide tool shank with special geometries, tipped with grade 350 carbide. The carbide tool shank directly under the grade 350 tip is curved and thin. The tip has a 3-degree side clearance and a 2-degree back taper; its width is 0.093 in. $\pm$0.001.

The cartridge toolholder is designed so the tool is located from two sides only. As a result, when a tool is inserted, it is always located in the same position as the tool before it, with no danger of operator error.

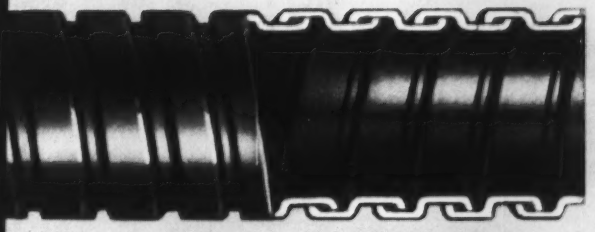
By having several of these blocks available, they can be easily preloaded in the tool crib. When the operator needs a new tool, he simply picks up a preloaded cartridge and inserts it in the main tool block of the machine. Since use of a dial indicator is no longer required, loading the tool block is reduced to about a 3-minute job.



TYPE FP WIRE BRAIDED



HEAVY DUTY INTERLOCKED



LIGHTWEIGHT SQUARELOCKED
Unpacked, cord packed, light asbestos packed, heavy asbestos packed

TWIN-LOK
Galvanized Lined
Stainless Steel Lined

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FLEXIBILITY

DEFIES HEAT...FATIGUE ABRASION...LEAKAGE

Penflex is ruggedly built hose with all of the flexibility required, plus the toughness and durability of metal. No matter how hot the material to be conveyed Penflex cannot be cooked like ordinary hose. It stubbornly defies rough abuse, abrasion and crushing.

From 1/8" I.D. to 24" I.D. . . . bronze, galvanized steel, or stainless steel . . . from an air compressor line to a diesel exhaust, Penflex makes them all for the steel industry. And Penflex "Flexineering"—the science of applying flexible tubing to fit the particular needs of the job to be done—assures the right tube in each installation. When you require tubing or hose that is tight as a pipe, but flexible . . . safe at high temperatures . . . and free from metal fatigue, specify Penflex.

Penflex manufactures a complete line of four wall interlocked and seamless welded corrugated flexible tubing for the steel industry. Write for your free copy of the booklet "Flexineering At Work."

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HEART OF INDUSTRYS LIFELINES

METALLIC TUBING

6 good questions about aluminum JOINING

...and 6 good answers by Kaiser Aluminum Distributors

If you have a problem in joining aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of Kaiser Aluminum's field staff.

Here are answers Kaiser Aluminum Distributors have given on specific joining questions asked by aluminum fabricators in various parts of the country. Questions such as these may also be bothering you.

Q. We've had difficulty in attaining good, tight joints in driving aluminum rivets. What is our trouble?

A. The most common cause of a poor joint in riveting aluminum is that the rivet is over-driven. Drive the rivet until it is tight, but do not over-drive. The proper procedure can be established by making control samples.

Q. We've been spot welding on curved aluminum surfaces. But we can't get a good weld with alloy 6061. Why?

A. The difficulty is in the welding tip . . . it's not making good contact on the curved surface. Change the tips to ones with conforming surfaces and you'll get a more perfect weld.

Q. We want to weld heavy sections of aluminum. What is the fastest welding method?

A. Where a large number of joints are to be made and the capital outlay is justified, the consumable electrode inert gas shielded arc method is the fastest. It is usually used on metal thicknesses greater than ⅛ inch. Arc welding usually requires less joint preparation, less carefully controlled welding technique and less skilled operators. Distortion of the welded parts is small because of the concentrated heat of the arc. And, post weld cleaning is not required.

Q. Too many of our welds have been unsound. Our welders are experts and have used proper welding techniques. What's the answer?

A. In your case the trouble is improper surface preparation. Make sure all aluminum is cleaned with mildly alkaline solutions or commercial degreasers before welding. Use a wire brush to remove heavy oxide. Make sure the aluminum is clean *before* you start to weld and your welders will do a good job.

Q. Soldering aluminum has really been a problem in our sheet metal shop. We can't get the solder to adhere to the aluminum. Is there a way to do this?

A. There certainly is, but first it is essential to remove the oxide coating from the aluminum sheet. Solder can't wet or adhere to an oxide coated surface. Scrape or clean the surface, then apply a specially prepared aluminum flux and solder. The melting point of aluminum solders are above those used for other metals and require use of a flame instead of a soldering iron.

Q. Small welds of aluminum have been unsatisfactory. We've noted tungsten inclusions and gas porosity in our welds. What's the trouble?

A. Your welders have been pencil-pointing heli-arc tungsten electrodes. This causes a greater density and a low starting current, thereby necessitating a longer dwell time at the beginning. Better have your welders use standard diameter electrodes and a higher starting current.

* * *

For the *right* answer, ask your Kaiser Aluminum Distributor

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your Kaiser Aluminum Distributor is ready to give you instant assistance.

Naturally, you can always depend on him for prompt service in supplying you with aluminum cut to your specifications *as you need it*. Take advantage of the personalized service and technical know-how offered by your Kaiser Aluminum Distributor. Call him today!

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Overhead crane hoisting a bundle of tubing. Strain gages hang just below the boom. Operator reads weight on a dial in cab

Saves Weighing Time

THE crane operator in the photograph is performing two operations at once: Moving and weighing a bundle of tubing.

Built-in scales save more than 40 per cent of the time formerly needed for weighing and inventory control at the Ellenville, N. Y., plant of Channel Master Corp.

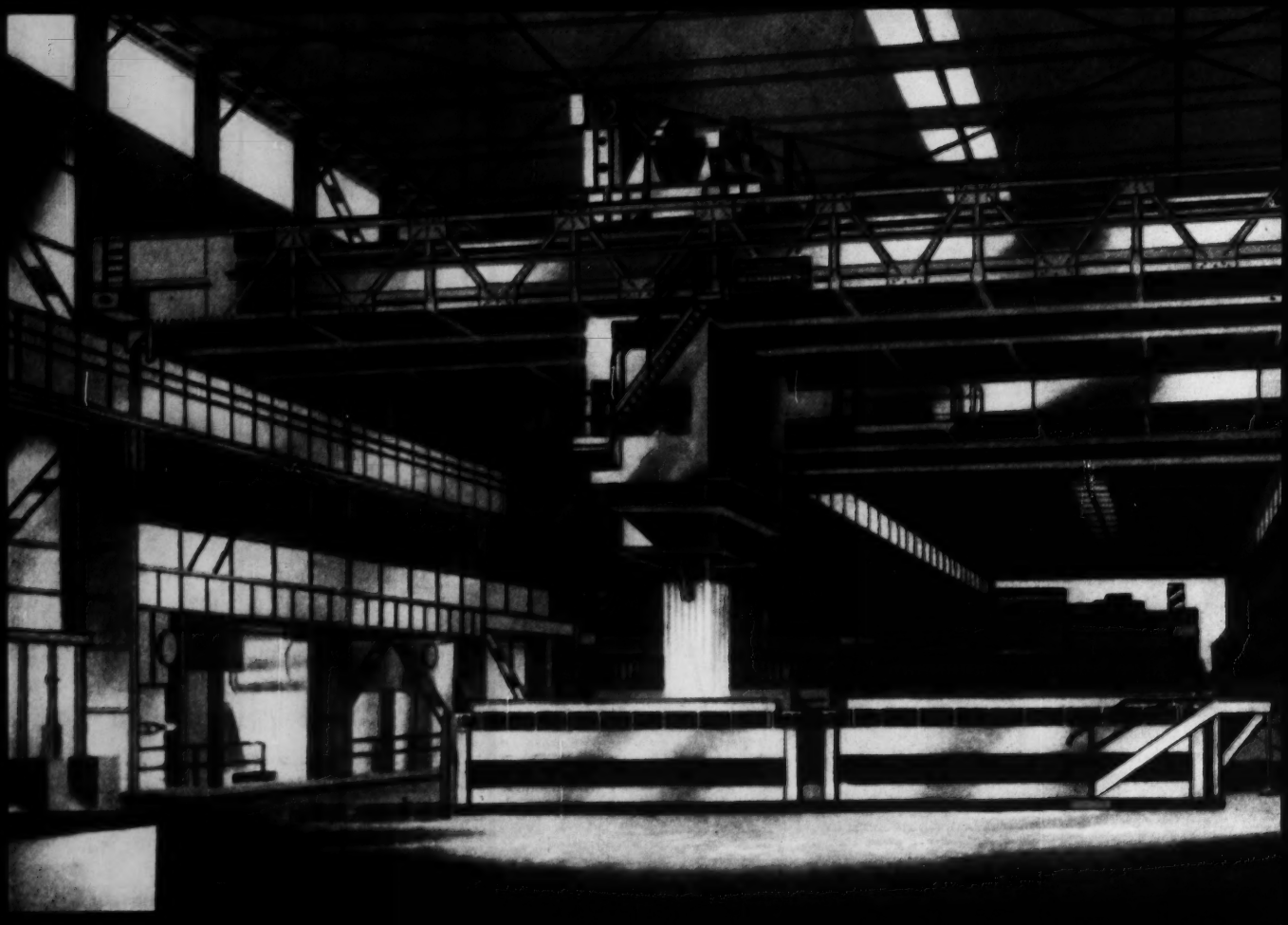
Records — To keep manufacturing departments supplied, cranes move tubing bundles from one bay to the next. Baldwin SR-4 crane scales are mounted beneath a boom; the load is attached to the scales.

The crane used to pick up a bundle of tubes at a processing point and carry it to a platform scale. After weighing, tubes were carried to the next operation. The procedure took about a minute. Since each part had to be weighed two or three times during processing, as much as three minutes were lost.

Less Time — The new system takes only a half a minute. The crane lifts the bundle at one department, and pauses when it is clear. The operator reports the readings to the rigger who records the weight on the job ticket.

The two SR-4 scales have a capacity of 2500 lb. Bundles weigh between 1000 and 2000 lb. An electronic mechanism automatically adds the readings, deducts the tare weight of hooks and lifting cables, and reports net weight only. A dial indicates the weight in pounds.

INTENSIFIED GRIP...



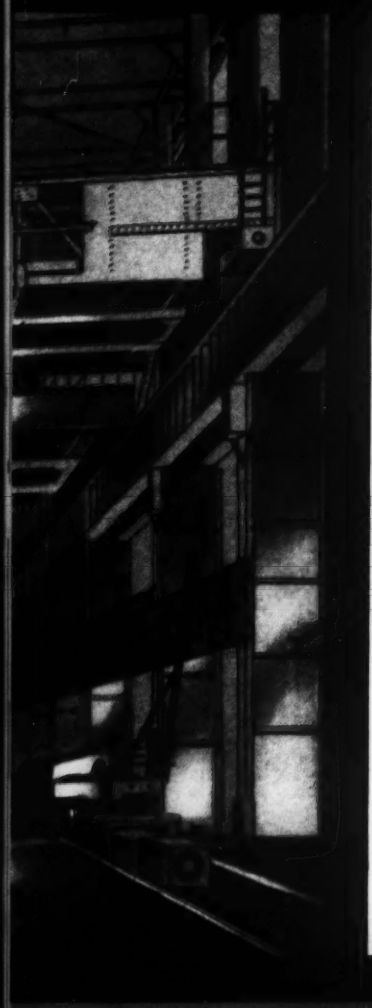
The tong grip of the conventional soaking pit crane depends *solely* on the weight of the ingot and when the weight of the ingot is removed, as in the case of placing an ingot on an approach mill table, the grip is reduced to zero and the ingot drops.

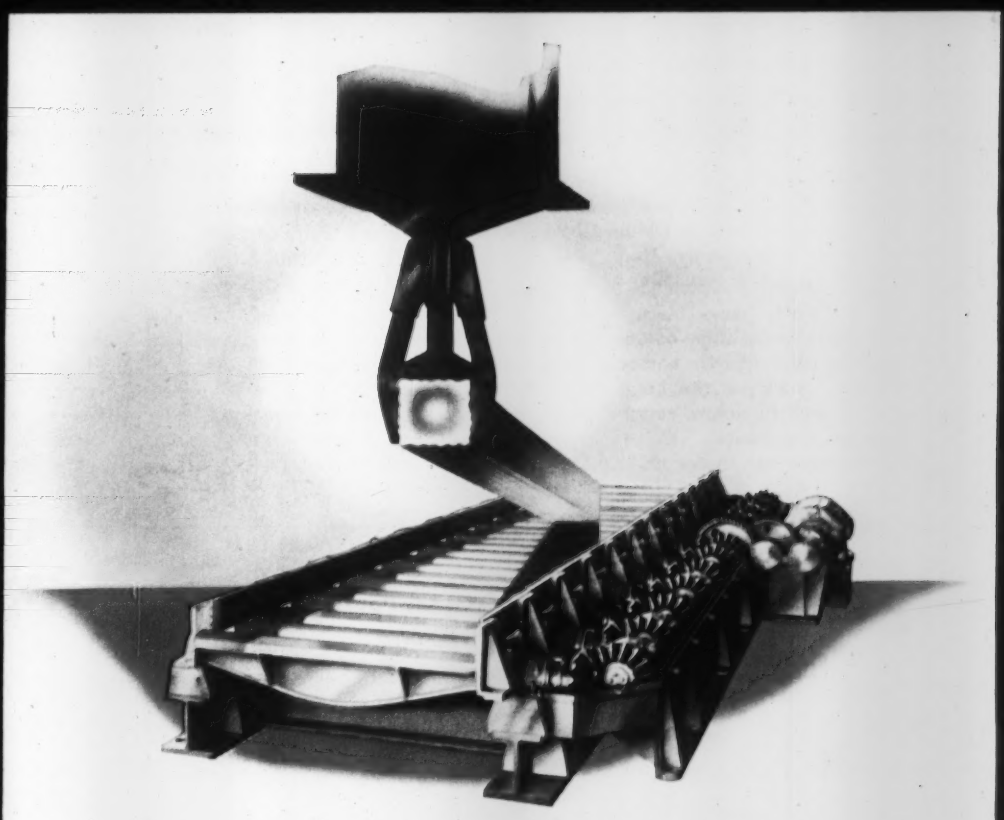
The tongs' grip of the Alliance intensified grip soaking pit crane *is* produced by the weight of the column *plus* the weight of the ingot. Since the weight of the column is usually equal to the weight of the ingot, the intensified grip soaking pit crane has the same grip *without* an ingot *in* the tongs as a conventional soaking pit crane has with an ingot, and *twice or more grip* as the conventional soaking pit crane when handling an ingot.

These intensified grip soaking pit cranes are built to handle ingots of any size and weight and incorporate all modern safety features. We welcome the opportunity to assist in solving your material-handling problems.

THE ALLIANCE MACHINE COMPANY

for Soaking Pit Cranes





The intensified grip soaking pit crane was developed by The Alliance Machine Company to hold ingots more firmly in the tongs and prevent dropping of ingots when they are placed on the mill approach table, ingot chariot or in the soaking pits. This is an exclusive Alliance feature.

Alliance

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

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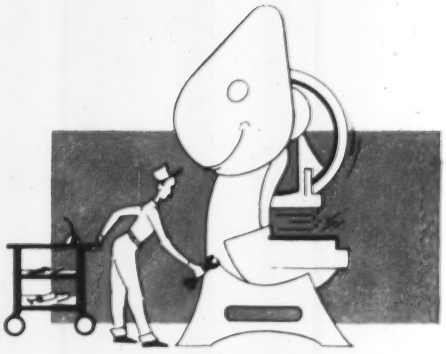
THE WORLD'S LARGEST BUILDER OF THE WORLD'S LARGEST CRANES

Keep Punch Presses . . . Punching

By E. J. WEYLER
Executive Vice President
Walsh Press & Die Co. Division
American Gage & Machine Co.
Chicago



ACCIDENT hazards and punch press down time can be reduced by preventive maintenance that is a regular and not a sometime thing.

Make punch press maintenance the fixed responsibility of one man, reporting directly to someone in authority, such as the shop foreman. That will assure regular and thorough inspection. Before getting the program under way, make sure that every punch in your shop meets the basic requirements for safe, efficient operation.

Take a Look — Walk through your plant and see if working areas are properly illuminated, and are uncluttered by boxes, crates, bolsters and other items not required for punch press operation. The floor area around your presses should be clean and free of oil at all times. Seating for operators should be adjustable to the height of the presses.

For maximum production, the position of the press should be such that strip or coil stock can be easily fed, and finished parts removed without interference. Scrap should be removed quickly and should not be permitted to pile up.

If your installations rate an O.K.

Check List for Punch Press Maintenance

1. Checkpoints—At each inspection, check over-all lubrication of press, care of bearings, slide alignment, ball socket and brake adjustments, flywheel driving pins, clutch bolts, bell cranks, latches, air ejectors, treadles, guards, motor adjustment and tierods

2. Lubrication—Lubricate the machine in accordance with the instructions provided with the press. (Generally every 4 hours of continuous operation and every 8 hours of single stroke operation)

3. Slide Alignment—To avoid excessive die breakage and wear, alignment between face of slide and bolster plate should not exceed 0.002 in.

4. Brake Linings—Clean or replace if saturated with oil or grease

5. Clutch—Remove hardened grease and oil frequently to assure free movement of the clutch bolt and other parts which actuate the clutch

6. Air Ejectors—Examine for air leaks and clean air strainer often

7. Treadles—Check springs, bolts, cotter pins and clamping screws for excessive wear, so that treadles will operate freely without rubbing against the side of the press

8. Guards—Make sure all guards are in proper working order to insure operator safety. Repair or replace defective guard parts

9. Tierods—Use to give added rigidity where press is being operated at full capacity

10. Bearings—Lubricate main and upper connecting bearings and gib bearings daily for long service

11. Ball Socket Assembly—Add machine oil to this assembly so that it will operate in a film of oil at all times

12. Brake Adjustment—If brake is too loose, it will cause the slide to go beyond the top of the stroke. Momentum may be such that the latch bracket is broken. Brakes which are too tight will overheat

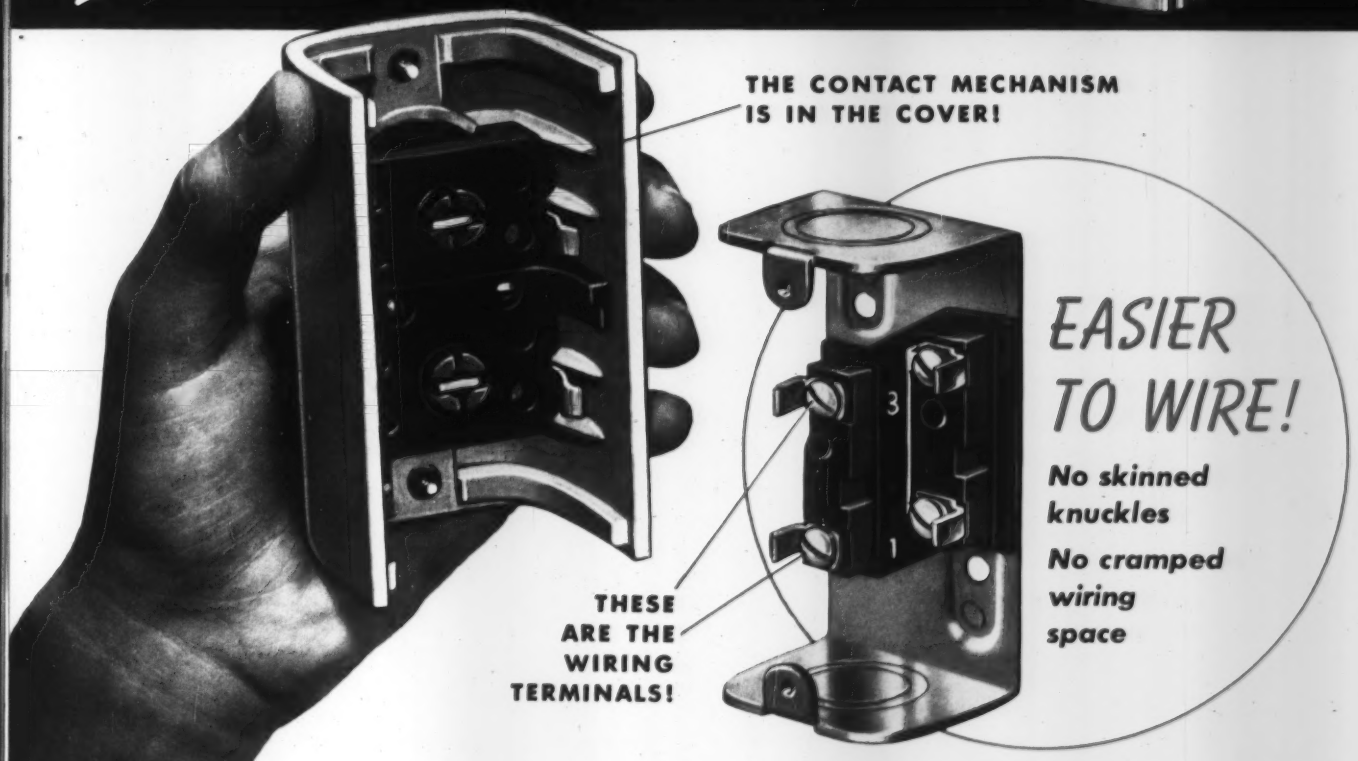
13. Flywheel—Replace striking pins occasionally. When worn they make clicking noises. Examine clutch bolt housing and remove burrs or roughness

14. Clutch Bolts—Clutch bolts must operate absolutely free to insure quick action. If the driving edge of this part shows excessive wear, replace it

15. Bell Cranks—Must engage and disengage the clutch bolt instantly. Check the spring occasionally because the spring barrel may become filled with hardened grease, or the spring itself may be broken or weakened

16. Motor Adjustment—Readjust the V-belts and motor drives occasionally by setting the turnbuckles. For proper power transmission, V-belts must not be too slack or too tight

Brand New Idea in STANDARD-DUTY STATIONS



EASIER TO WIRE!

No skinned knuckles

No cramped wiring space

Here's an entirely new idea in push button stations—a wrap-around cover—with the contact mechanism part of the cover. Removing the cover exposes the terminals for instant and easy wiring. Strong, spring type, silver plated contacts connect the push button assembly in the cover with the terminals in the base.

Matching ribs in the cover and notches in the terminal blocks assure that the wiring connections are always correctly made. A bakelite shield protects the contact mechanism and prevents careless wiring from interfering with the contact operation. Concentric knockouts are provided in both top and bottom of the heavy metal base.

You will want to know about this new standard-duty station because—it is good looking—it takes less time to install—it was designed for the convenience of the installation engineer.

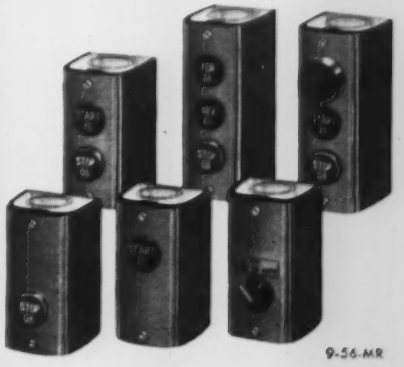
Let us show you a sample of this "brand new idea" in standard-duty stations!

A-B Quality

ALLEN-BRADLEY

MOTOR CONTROL

Allen-Bradley Co., 1314 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ontario

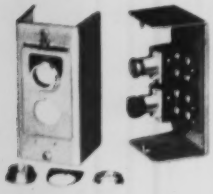


Bulletin 800 standard-duty push button stations can be supplied with one, two, or three buttons, or as a selector switch. Also available with pilot light. Furnished only in NEMA Type 1 enclosures.

9-56-MR

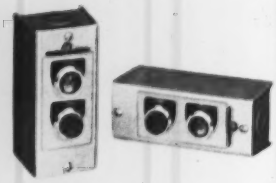
Also... NEW HEAVY-DUTY PUSH BUTTONS

NEW FLEXIBILITY!



You can assemble any special heavy-duty station from a small stock of standard push button, selector switch, and pilot light components. There is no need to wait for long delivery of your special stations.

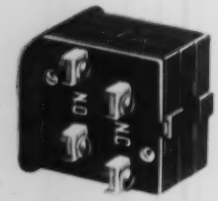
Stations can be arranged for either vertical or horizontal mounting. Name plates can be rotated to any position, replaced with any standard marking, or removed entirely.



NEW ENCLOSURES!

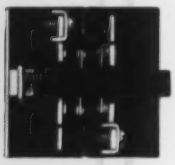
Each button, selector switch, or pilot light is a self-contained unit which can be mounted in attractive new enclosures. Standard enclosures accommodate up to eight units, but enclosures can be furnished for larger numbers.

NEW CONTACT BLOCK!



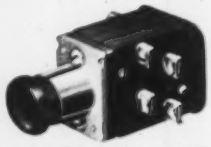
Above: View of contact block, showing terminals for normally open and normally closed contacts. Right: Contact block, with cover removed, showing stationary silver alloy contacts and pushrod carrying the moving contacts.

Bulletin 800 heavy-duty push buttons have the same molded contact blocks that have proved so dependable in Bulletin 800T oiltight push buttons, although they are not themselves oiltight. And all of them are equipped with double break, silver alloy contacts.

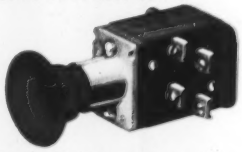


NEW OPERATORS!

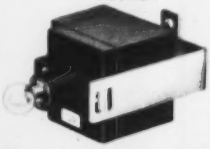
Operators, which mount on the contact block, are available in many types, and push buttons come in various colors.



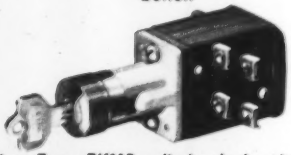
Type AK2B flush head START button



Type DK6A mushroom head button



Type PK16 pilot light with transformer



Type EK11B cylinder lock unit

9-56-MR

A-B Quality

ALLEN-BRADLEY

MOTOR CONTROL

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. In Canada—Allen-Bradley Canada Ltd., Galt, Ontario

a regular program of preventive maintenance will pay big dividends.

Press Accuracy—In terms of value of products manufactured and cost of the dies to produce them, a punch press is probably the least expensive machine which can be bought. In spite of initial low cost, it is important to maintain the accuracy built into your press. Otherwise, dies costing many times more than the press will be worn out quickly, and stampings of incorrect size and shape will be produced.

Fortunately, the punch press is rugged. It needs only minimal preventive care to avoid expensive repairs and down time and assure a long productive life. Even though maintenance requirements are small, they must be followed carefully and systematically (see check list on page 172).

Right Start—Preventive maintenance really begins with the manufacturer. It is his responsibility to use proper packing and shipping methods, so that the machine will reach its destination in factory perfect condition. The manufacturer should stand ready at any time to examine a user's installation which is not giving satisfaction.

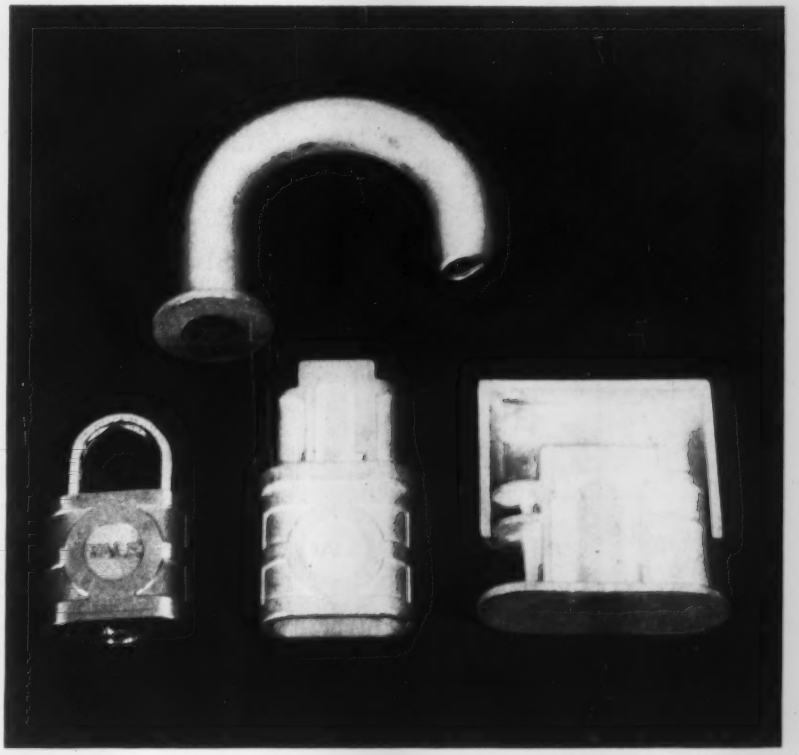
To make your maintenance responsibilities lighter, find the answers to these questions before you make your next punch press purchases:

1. What kind of help is the manufacturer prepared to offer me after I've bought a punch press from him?

2. Is my press going to be "disowned" a few years from now because the manufacturer doesn't make spare parts for my model?

3. Will I have to carry a large inventory of spare parts to avoid down time, or can I count on the manufacturer to supply any part within 24 hours?

If you ask these questions before you buy a punch press and follow the maintenance suggestions after you buy, you'll be adding many years to the life of each press. More importantly, punch operations will be more economical and and scrap losses less.



Close-tolerance brass die forgings made on cored forging presses. Although not technically cored forgings (which are characterized by side cavities forged at an angle to the central cavity), these exhibit similar qualities of high density, clean finish and minimum flash

Forging with a Twist

THAT hollow gooseneck above looks like a piece of tubing sweated to a washer. It isn't. It's a one-shot hollow brass forging with the bend forged in. You may have seen it on display at the Metal Show in Cleveland.

How it was made is still the secret of Carl J. Pfeifer, president of National Cored Forgings Co. Inc., South Norwalk, Conn. National, a subsidiary of Bridgeport Brass Co., made the forging as a demonstration piece, but it has practical applications. The shape is typical of certain types of faucet nozzles, for example.

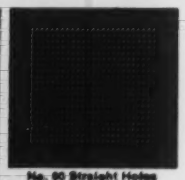
Savings—In volume sufficient to write off the cost of the forging dies, a faucet made in this manner could be cheaper than one made from tube and stampings, according to Mr. Pfeifer. The rough forging stock costs far less than tubing does, operations such as bending the tube and brazing on the washer are eliminated, and the final part is stronger.

As an added example of savings through close-tolerance die forging, Mr. Pfeifer pointed to the small lock, above. The trick here is to forge lock case and tumbler section in one piece, then saw them apart. The tumbler section then slips into the no-draft cavity in the case.

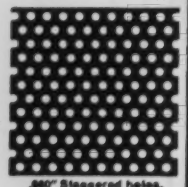
The bigger lock case is a little husky for this two-birds-with-one-stone approach, but the cutaway section shows how neatly two separate forgings can be made to nest together. All the detail, including the cavities, the numbers and the name, is achieved at a single strike. Flash has not been trimmed from these parts—there wasn't any to speak of.

Perforated Materials for *Every* Application

Contact H & K for any perforated materials your product may require.



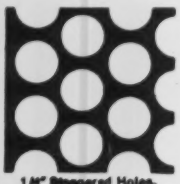
No. 90 Straight Holes
960 holes per sq. in.
.060" diam. 50% open.



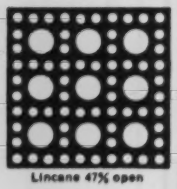
.060" Staggered holes.
196 holes per sq. in.
3/32" centers. 36% open.

We will be glad to work with you on your perforating problems.

We have tools for perforating thousands of different patterns.



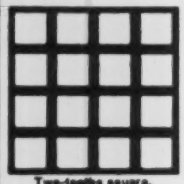
1/4" Staggered Holes.
9/16" centers.
.39" diam. 58% open.



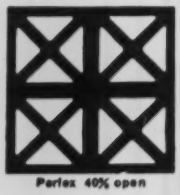
Lincane 47% open

See our catalog in Sweet's Product Design File.

Perforating all metals, Masonite, plywood, paper, cloth and plastic.

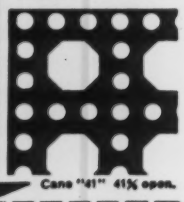


Two-toothe square.
64% open.



Perlex 40% open

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



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Profile of a Healthy Industry

Tool and die makers never had it so good. They expect to do about $1 billion worth of business this year. Big retooling programs of auto makers figured in boost

"I THOUGHT business was good in 1955, but this year will make it look conservative," a maker of dies told STEEL. He believes his books will show a gain of about 40 per cent.

His joy was shared by almost everyone at the meeting of the National Tool & Die Manufacturers Association in Hartford, Conn. This year the industry will do about $1 billion worth of business, an all-time high. Last year, the figure was $700 million.

Big Orders—Part of the success can be attributed to big retooling by auto makers for '57 models. And diemakers point out that automotive business is no longer restricted geographically.

Judging from new tooling orders being placed by the automotive builders, diemakers predict that 1957 will match 1956.

Diversity—Another strong trend in tool and die shops is partly responsible for the current prosperity. Where the industry used to reflect only tooling business, it now goes far beyond that. Tool and die shops are being sought after to build pilot and experimental parts for a host of industries, including the instrument, aircraft and appliance groups.

The Arrow Tool Co., Wethersfield, Conn., is an example. In 1945, when the tooling business was extremely competitive, John D. Dewhurst, its president, began looking around for other projects for his plant. Four years later, he picked up several orders to build experimental and prototype parts.

The Switch — By 1952, 60 per cent of the company's business was in prototype programs. One program hit—mechanical systems for the tape drive on IBM's big 700 series computers. Arrow became a production shop. Although it has done no tool or die making for two years, it is getting back into the tooling business now.

Ford Still Retooling

Ford Motor Co., Dearborn, Mich., has its tooling for 1958 models under way. Equipment has been moved out of one engine plant into another. More is being bought for the vacant plant, presumably for a brand new engine.

Continual retooling programs of Ford and other automotive makers are adding to the backlogs for special machine builders. At the National Machine Tool Builders Association meeting in Chicago, one builder of automation equipment pointed out that he expanded to double his production capacity, then tripled his orders. He says he can't deliver anything in less than 15 months.

Tomorrow's Job Shop

Although details are still under wraps, several machine tool builders feel that the job shop of the future is in the works. They point out that orders have been placed by a job shop owner for a series of five machines, all tape controlled. Tapes for all jobs will be stored in a central location. Tape controls for the machines also will be centralized. The machines will process a series of similar parts in sequence. Operators will keep stock in the machines; they'll move parts by hand from one machine to the next.

All complex setup and cycle operations will be handled by the tape. One guess is that the shop will pay for itself within five years.

Core Steel Tester

Maintains high quality of transformer core steel more easily than former methods

BETTER control of core steel quality: That's what engineers at General Electric Co.'s Power Transformer Department, Pittsfield, Mass., get with their new wide sheet testing machine.

The device measures core loss of full-size laminations before assembly. Previously, expected core loss was measured by the Epstein method, using small strips of steel that were not always representative of that used in the final product.

TEST MACHINE
. . . handles full-size laminations

Direct Reading — Developed in GE's Transformer Laboratories Department, the wide sheet tester is simpler, quicker and more accurate than previous testing methods, say GE engineers.

It gives a direct reading of core loss in watts per pound for laminations of any size, after the machine has been set for the sample's length, width and thickness. The test is made at the normal operating magnetic density of a power transformer core.

Sample tests are made daily on core laminations selected at random from the factory floor. Results are reported to research scientists who keep a running check on the quality of core steel used.

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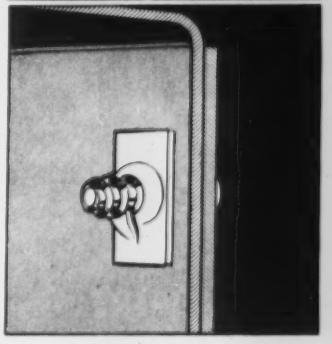

eliminate slow, complicated and costly assembly operations in a multitude of industrial applications. They provide greater holding power—eliminate special tools, threaded nuts, lock washers—cut assembly steps—save valuable production time.

Engineered and designed with the famous 360° grip Prestole impression, Flat Nuts are available in a variety of standard types for immediate delivery to your plant production schedule. In addition, they can be designed and produced in many special sizes and shapes to meet specific requirements and applications.

In either case, they maintain their ability to meet severe torque and tensile requirements and distribute the fastening load over a larger area through Prestole's greater bearing surface. In thousands of applications, Prestole Flat Nuts continue to function long after other fastening methods have failed. Fastening problems of all types are being solved daily by Prestole's engineers and technicians. Consult your nearby representative or write direct to the factory for engineering assistance and service based on years of "know-how" in the fastenings industry.

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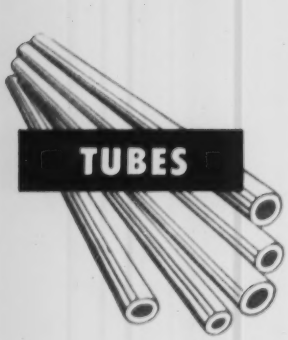

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Contact our nearest office or write to Peterson Steels, Inc., Springfield Road, Union, New Jersey. Address: Dept. S

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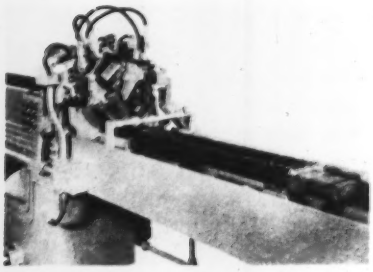


Broaching setup for locks . . .

Tumbles Out Parts

A BROACHING setup using an eight position indexing fixture, manual loading and automatic unloading enables a midwest lock manufacturer to turn out 1250 brass lock cylinders an hour.

Work is done on a model HS, 10 ton, 60 in. stroke universal horizontal broaching machine built by Colonial Broach & Machine Co., Detroit.

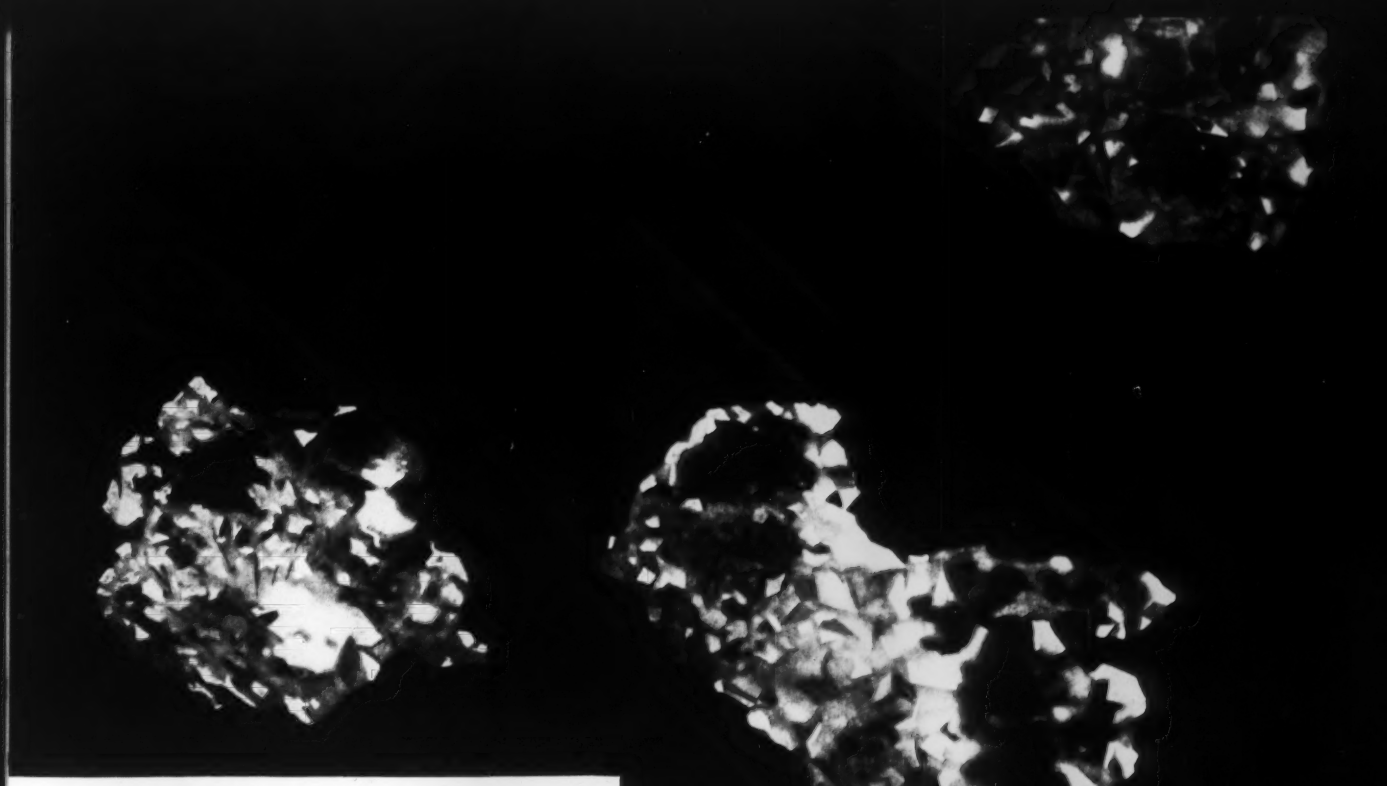
Flexible—In addition to the high production rate, flexibility in part size also is possible. Cylinders varying in length from $\frac{5}{8}$ to 2 in. and 0.402 or 0.451-in. in diameter can be handled by the fixture with only minor tooling changes.

Operation is continuous; five lock cylinders are broached at a time. The rotary fixture has four broaching stations and four broach return positions. The fixture indexes 45 degrees at a time, every other index bringing a new group of lock cylinders into broaching position. Parts are loaded manually, but are clamped and ejected automatically. Broaching speed is 30 fpm, return speed is 1000 fpm.

Accurate — Alignment tolerance on the part is held within 0.001-in. variation, an important consideration in assuring trouble free operation of the assembled locks.

The machine is controlled by pushbuttons and limit switches.

Finish machined lock cylinders



Millions of sharp, superheated particles, (photo shows alumina particles magnified 150x) traveling at high velocities, quickly wear dust collector linings, mains, downcomers, etc. Metals and most ceramics simply can't withstand this harsh abrasion. But some refractories can—even at temperatures as high as 2500°F.

Refractories . . . where **abrasion** is a problem

Unequalled resistance to abrasion whether caused by tiny gas-borne particles or sliding steel billets—is one of the most useful properties of CARBOFRAX® silicon carbide refractories. For example, a CARBOFRAX dust collector lining on an ore sintering machine is still in use after 10 years service.

And when abrasion is combined with high temperature, the exceptional resistance of CARBOFRAX super refractories becomes even more apparent and useful. When used in the exhaust lines of gasoline catalytic cracking units in temperatures ranging around 1200°F, these refractories lasted 3 years, as compared to alloy rings which lasted for 6 months. On a gas fired extrusion mill furnace—where steel skids lasted 5 weeks—CARBOFRAX refractories lasted 156 weeks.

Wear resistance is not the only unusual property of these refractories. They also offer heat conductivity roughly 11 times that of fireclay, with sufficient hot strength to withstand 25 psi at 1720°C. CARBOFRAX refractories are but one of many super refractories pioneered by Carborundum and offering a wide range of unusual properties.

Carborundum's new magazine "Refractories" pinpoints many practical applications for these unusual products. The forthcoming issue carries a feature article on "Wear Resistance". Send for your copy today.

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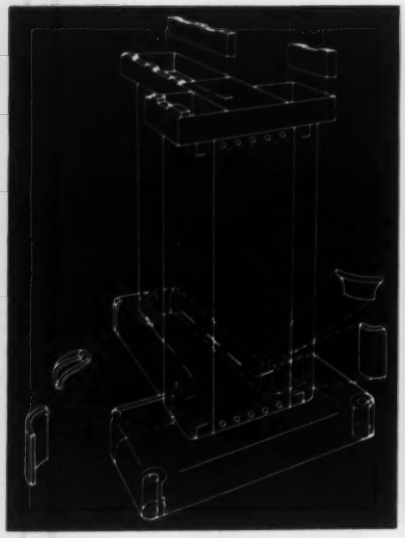
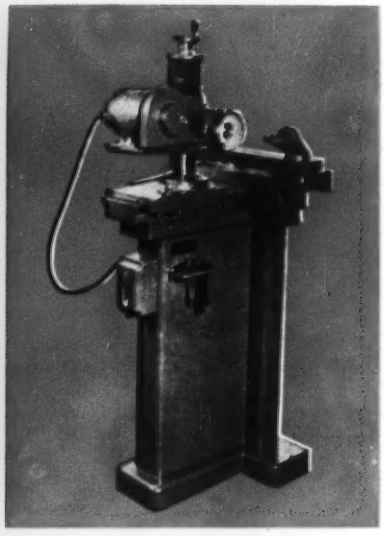
Discard tradition for more efficiency at a lower price. In this article, the authors tell how they redesigned the pedestal for a Brown & Sharp cutter grinder

By RICHARD B. FLEURY & LEONARD McDERMOTT
Brown & Sharpe Mfg. Co.
Providence, R. I.





OLD design, made with many complicated parts, conformed to tradition

New Design Simplifies Weldment

This is based on a prize-winning article in this year's machine design competition, sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland

THE MACHINE bases shown above are weldments. Both support identical cutter grinders. But the base on the right is a better design. Here's why:

It costs 40 per cent less.

The improved design looks better because lines are most functional.

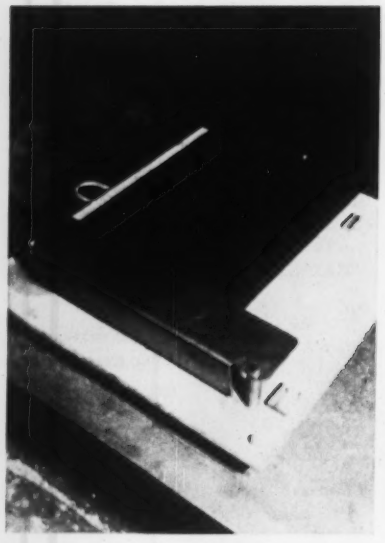
It weighs less and is easier to move and adjust.

First Try—Brown & Sharpe Mfg. Co., Providence, R. I., originally made the cutter grinder for bench use, later added a welded support. Deficiencies in the first design made the second a necessity. Production people, for example, were consistently unable to meet work standards.

The old design used 7 gage metal for formed sides, front panel and T-shaped upper and lower pans. Separate pieces were inserted to complete the 3-in. depth of the pan. Convex and concave insertions for the ball corners on the pedestal were troublesome and time consuming. Even the three tubular feet were milled on an angle to provide clearance for those corners.

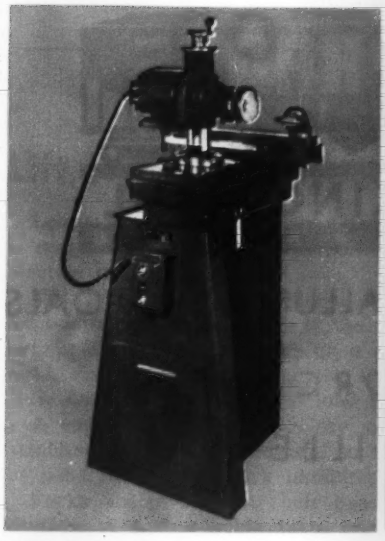
There were a number of deep and hard-to-reach joints. Angles were welded to the upper and lower pans merely to position the front panel for final welding. Thick rectangular blocks for the grinder slide were mounted inside. (They could have formed the outside walls.) Even a wrench rack was bolted on.

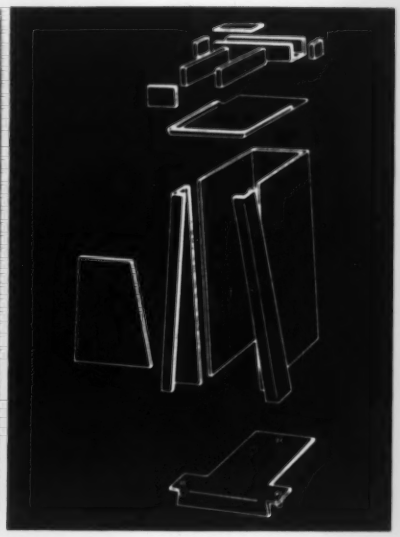
Brown & Sharp assembles its new pedestal . . .



by placing base in this fixture . . .

tacking U-shaped cabinet to base . . .





NEW design made from fewer, larger parts, is stronger, lighter, better looking

Final machining was excessive. It included milling, drilling and tapping. Welds were ground and polished to remove excess weld metal.

Turn Around—The new design re-orients the base 180 degrees, eliminating the pedestal with the troublesome round corners. The T-cross section is replaced with two tapered wings. Only six basic supporting members are needed; seven small blocks form the upper pan. All parts are sheared, bent or notched. The supporting members are now made from 10 gage rather than 7 gage metal—a saving of $7.

Two simple fixtures are necessary for assembly—one for the base and cabinet, the other for the top pan assembly. Here's how the base is assembled:

1. The base plate (or pan) is located in the fixture. Correct height is maintained with three tubular feet bolted between the fixture and the assembly.

2. The U-shaped front panel is tacked to the base plate with 2-in. welds.

3. Wings sections are positioned by hand and tack welded. Corner welds are completed.

4. Back plate is clamped and welded continuously.

5. Irregularities on the top are surfaced with a portable grinder.

6. Cross slide and table bed mounting blocks are positioned with the predrilled holes and fixture dowel pins. After each weld, wet cloths confine excess heat.

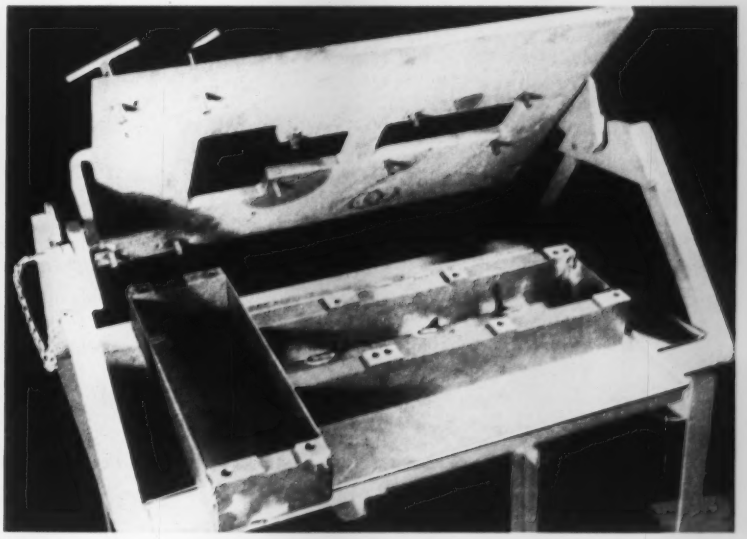
7. The top pan assembly is placed. Milled surfaces are aligned with a height gage. Top pan is squared and centered by eye, tacked to hold. Welding is completed.

Welds are easily ground and blended for prime painting. Only one preliminary machining operation is needed: A skim milling to bring cross slide and table mounting blocks into a plane surface.

Foundation — Designers, of course, should specify sound welding procedures and rules to get the most from a weldment. But if you are faced with traditions like those for machine tools, beds, tables, etc., we believe that it's best to start with a fresh approach. You'll get lower costs, better integration of size, weight, appearance, accessibility and function.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

then welding wings and back plate.



Top is last. This one's been tacked, ready to weld to cabinet

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NEW YORK 17, N. Y. 150 East 42nd St. Tel.: Oxford 7-5060	PORTSMOUTH, N. H. Gosling Rd., Box 478 Tel.: Geneva 6-4120	PROVIDENCE, R. I. 1141 Hosp. Trust Bldg. Tel.: Gaspee 1-8500	RICHMOND, VA. Central Nat. Bk. Bldg. Tel.: Richmond 2-9066

and C. H. SPRAGUE & SON (CANADA) LTD., 1478 St. Catherine Street West, MONTREAL

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Lift Truck Uses Magnetism To Speed Plate Handling

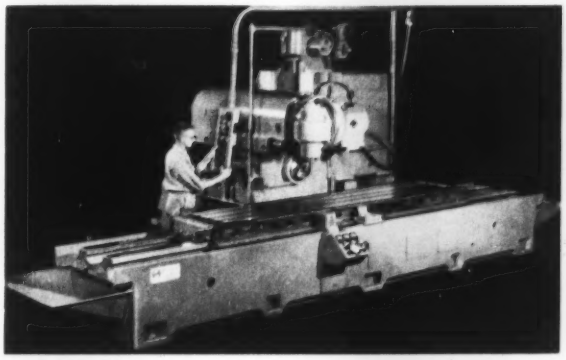
Loads are prevented from slipping or tipping by a magnetic attachment between the forks of this electric truck.

The magnet becomes energized as soon as the load depresses a bar switch in the middle of the magnetic plate. This also turns on a small light on the cowl, showing the operator the magnet is working. It is de-energized when the load is deposited.

A control switch permits the automatic magnetic attachment to be turned off, so the lift truck can be used for regular fork handling.

Forks are pivoted at their base as a safety precaution. A spring holds them upright when empty, while the weight of a properly placed load moves the fork backs against a pair of stops. If the load is not placed properly, the truck will not move. *Write*: Yale Materials Handling Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. *Phone*: Orchard 3-1200

Milling Machine Has Spindle Speeds of 14 to 1450 RPM



Independent motors on this bed-type unit power the longitudinal feed of the table, crossfeed of the column and vertical feed of the head.

The ram-type head is adjustable through 360 degrees both parallel and crosswise to the machine table. When not in use, the head can be retracted to clear the horizontal spindle.

A selector switch on the control pendant provides 24 speeds for the horizontal spindle and the all-angle head. The machine has verniers for table, column and head positioning.

Mechanical screw feeds make it possible to use controlled tracing and programming. *Write*: Sundstrand Machine Tool Co., Rockford, Ill.

Armor Protects Carbon and Graphite Pipe

Karbate is an impervious carbon pipe with a strong, glass fabric bonded to its outer surface.

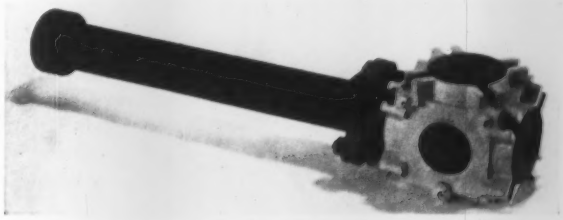
If the pipe breaks, the fabric keeps it intact, holding line pressure and preventing gross leakage.

The pipe comes in diameters of 1 to 4 in. in lengths up to 9 ft. Flanged and plain ends are available.

Tees, couplings, flange collars and 90-degree elbows are made in the same sizes as the pipe.

Connections are made through a protective metal housing, which isolates the fitting from external mechanical stresses caused by misalignment or piping expansion or contraction.

The pipe provides corrosion resistance, freedom



from metallic contamination and resistance to thermal shock. *Write*: National Carbon Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

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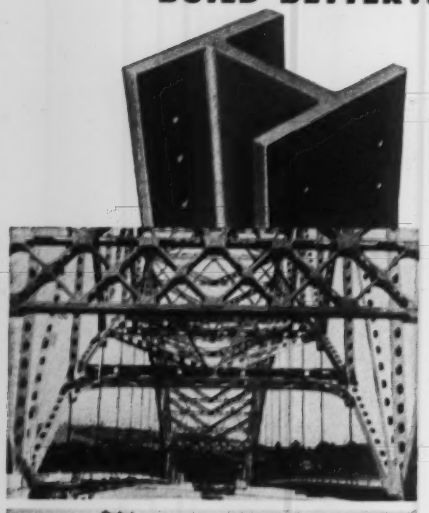
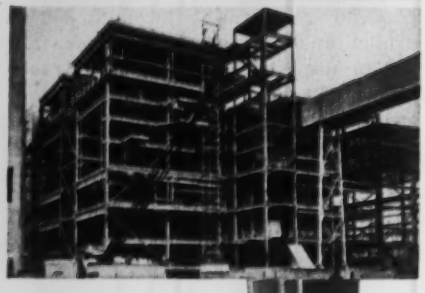
REDUCE COSTS...
BUILD BETTER...





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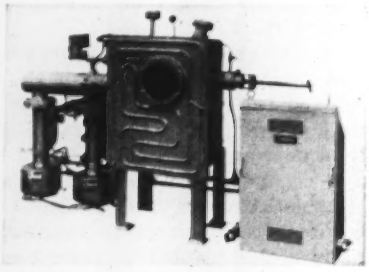
NEW PRODUCTS and equipment

Vacuum Furnace

Model 437-520 is designed for fast production of parts by investment casting or permanent mold procedures.

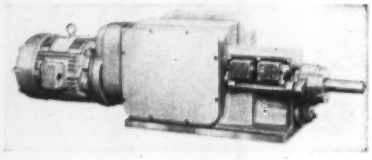


The furnace can melt and pour single casts of 5 to 17 lb under vacuums as low as 2 microns. Cycles as short as 10 to 12 minutes are possible when vacuum-melted metal is used for the feed stock.

The furnace is supplied with induction heating elements of 20, 30 or 50 kw. *Write*: F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa. *Phone*: Cumberland 9-0100

Drilling Unit

This cam feed unit will advance a single tool in the spindle or a multiple head attached to the spindle carrier.



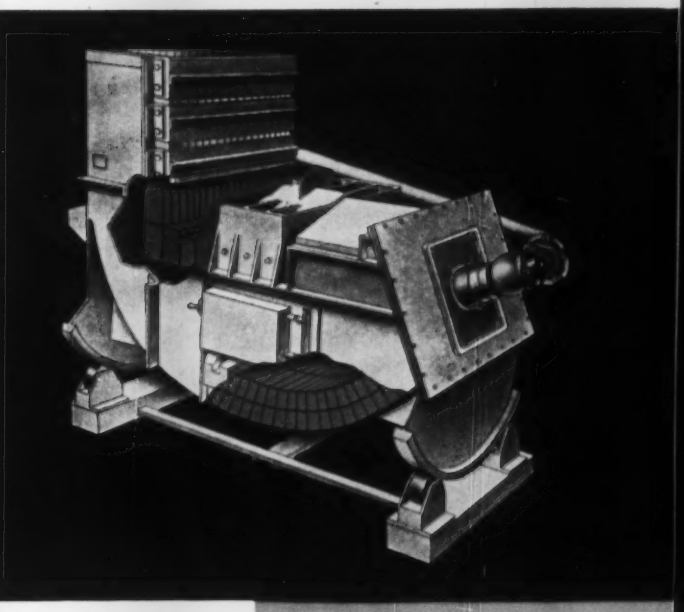
The unit uses a cam plate which needs only ¼-pint of oil in 8 hours of operation.

Series 4000 units are powered by ¾ to 5 hp motors. *Write*: W. K. Millholland Machinery Co. Inc., 6402 Westfield Blvd., Indianapolis 20, Ind. *Phone*: Glendale 2216

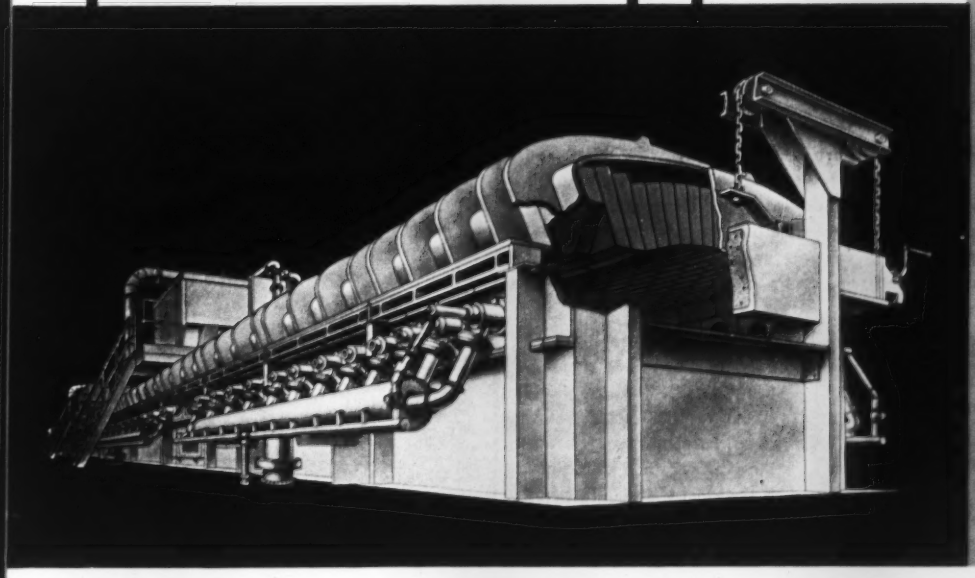
Transfer Machine

This 24-station machine processes 128 cast iron converter housings an hour. At the second station, three target pads are milled on one face of the parts while they are located from critical inside clearance surfaces. This eliminates the

Why B&W Allmul Firebrick withstand punishing service in furnaces like these



▲ Direct-fired reverberatory furnace for melting brass, aluminum, and iron. For longer refractory life, B&W Allmul Firebrick are used to line the bath and arch.



◀ In this type of furnace for continuous high speed heating of strip for welding into pipe, temperatures in excess of 3000 F are common and the atmosphere is contaminated with iron oxide. Because of their resistance to spalling and metal penetration, B&W Allmul Firebrick have set new standards for refractory life in bungs, burner blocks and recuperators.

B&W Allmul Firebrick stand up under extremely high temperatures at continued high rates of operation because they are produced from electrically melted mullite grain by a highly efficient process. These top-quality brick have high hot-load strength, high resistance to spalling, good volume stability and a melting point of 3335 F.

They are practical from a cost standpoint for a wide range of applications in the ferrous and non-ferrous metal industries. Illustrated on this page are a butt-weld furnace as well as a direct-fired reverberatory furnace. Other services are direct and indirect-arc electric furnaces, air furnaces, furnace hearths subject to iron oxide scale attack, crucible melting units and furnaces melting many non-ferrous metals and alloys.

Your B&W representative can show you how B&W Allmul can lower your refractory costs in many heavy-duty services. Consult him or write for Bulletin R-34A, giving data on B&W Firebrick for exacting services.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

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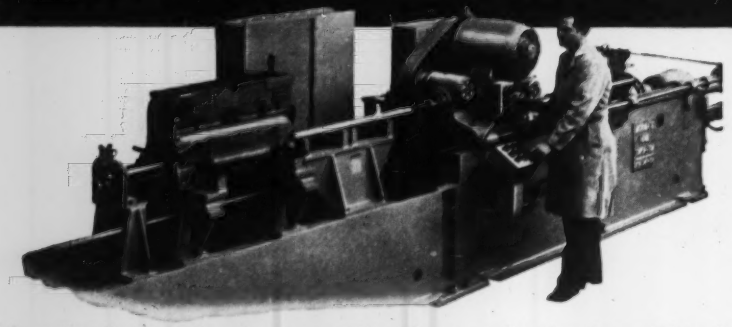
R 997

WHY CUMMINS main bearings are MICROHONED

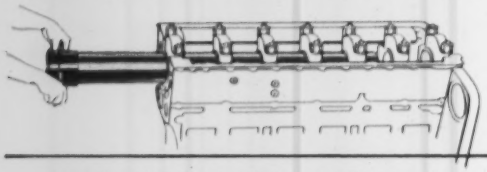


"Cummins diesel engines have a world-wide reputation for dependable, low-cost power. Here at Cummins, we attribute the wide acceptance of our engines to constant searching for better processing methods and improved engine performance.

"For example, if our crankshaft main bearings were undercut at the ends, tapered or out-of-round, then the full load of the journals would be borne by relatively small areas. This would cause bearing inserts to overheat and quickly break down. Also, should the bearings be misaligned, the crankshaft would flex during rotation and cause fatigue failure.

"However, by Microhoning our main bearings we secure *round, accurately-sized* and *aligned bores.* Cummins is the first diesel manufacturer to Microhone its main bearings. The surfaces of Microhoned bearings are clean-cut, free of deformed metal and the finish is consistent in every bore. In addition, the consistent accuracy generated by Microhoning permits us to make faster set-ups and use higher cutting feeds on preceding boring operations—Microhoning automatically corrects all inaccuracies.

"After Microhoning, all main bearing bores are checked with a gage plug 44 inches long and .0007 inch under required bore size. Gage must have a simultaneous slip-fit through all bores in the block. Tolerance for roundness is less than .0002 inch and finish is held to the specified 55 microinches."



Learn how Microhoning will give you efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

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☐ Please send Micromatic literature and case histories.

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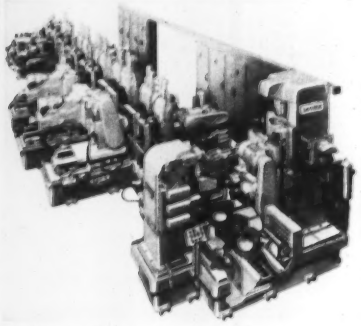
MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

NEW PRODUCTS and equipment

use of a pallet type mechanism or fixture in later machining operations.

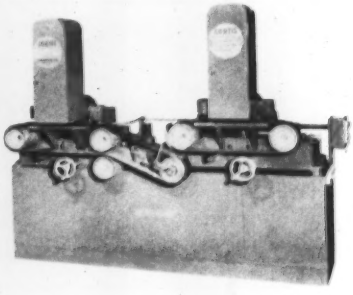
The transfer unit has an integral four-spindle boring operation. All holes are automatically air gaged and automatically probed before they are tapped to assure correct depth.



The machine (it's about 18 x 55 ft) is made up of nine individual segments, each with its own electrical control panel and base. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123

Abrasive Belt Grinding

Both sides of a workpiece can be finished with one handling by the 304C2 double side grinder.



A turnover transfer unit permits the grinding and polishing of pieces of different sizes and shapes.

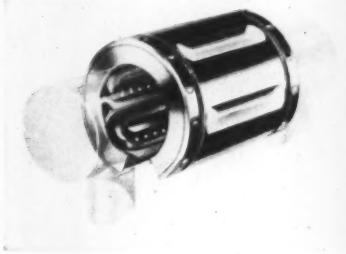
Abrasive belts 4 in. wide and 54 in. long are used. *Write*: Curtis Machine Corp., Jamestown, N. Y. *Phone*: 6-181

Linear Ball Bearing

This open bearing permits the use of shaft support members along the length of the shaft traversed by the bearings. The bore diam-

eter can be adjusted by setscrews or other clamping arrangements.

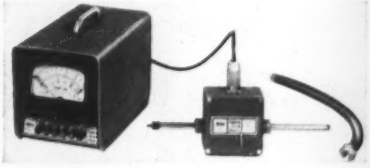
By using adjustable shaft supports, a precision antifriction way can be mounted on a rough casting or other uneven base.



The bearings are made for shaft diameters of 1 to 4 in. *Write*: Thomson Industries Inc., Manhasset, N. Y. *Phone*: Manhasset 7-1800

Speed and Feed Meter

The MF-2 measures and indicates linear rates of travel and revolutions per minute on lathes, boring, milling and other hydraulically actuated machines.



The feed rate pickup converts linear motion of any length of travel into an electrical signal. The reading is given on a large illuminated meter which has four scale ranges.

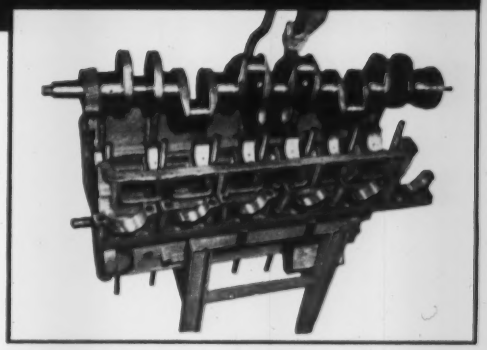
The fixed tachometer pickup has no moving parts and is easily mounted on the machine. *Write*: Industrial Division, Maico Co. Inc., 21 N. Third St., Minneapolis, Minn. *Phone*: Federal 9-7041

Lathes

This series of 11 and 13-in. swing lathes comes in a variety of bed lengths with center distances of 26, 36 and 48 in.

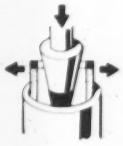
Spindle speeds are infinitely variable and range from 40 to 300 rpm in back gear, 200 to 1800 in direct drive. Only 9 seconds are required to change from low to

HOW MICROHONING generates round, accurate, aligned bearing bores



All types of cylindrical surfaces, including small diameters and combinations of soft and hard metals . . . interrupted by keyways, undercuts, ports, reliefs or cross holes . . . can be economically Microhoned to precision tolerances and alignment.

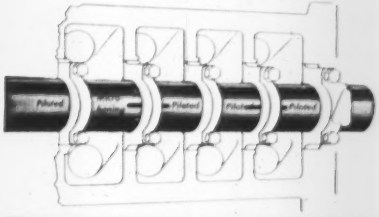
A typical example of Microhoning interrupted cylindrical surfaces is the Cummins Diesel Engine application. Here's how Microhoning generates accuracy and alignment in the crankshaft main bearing bores:



1. Cutting pressure is applied radially from the center of the Microhoning tool body. Abrasives and guides both are expanded by the same feed force, and wear at the same rate.

2. Abrading action is divorced from the effects of spindle or driveshaft vibration and misalignment by a universal joint that is between tool body and driveshaft.

3. The single bank of abrasives travels through all bores on every stroke. As abrasives are Microhoning one bore, the tool is piloted by the plastic guides in the other bores.



The principles and applications of Microhoning are thoroughly explained in a 16mm, 30-minute sound movie, "Progress in Precision". We'll be glad to reserve a print for your use.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).

☐ Please send Microhoning literature; I am interested in the following application _____

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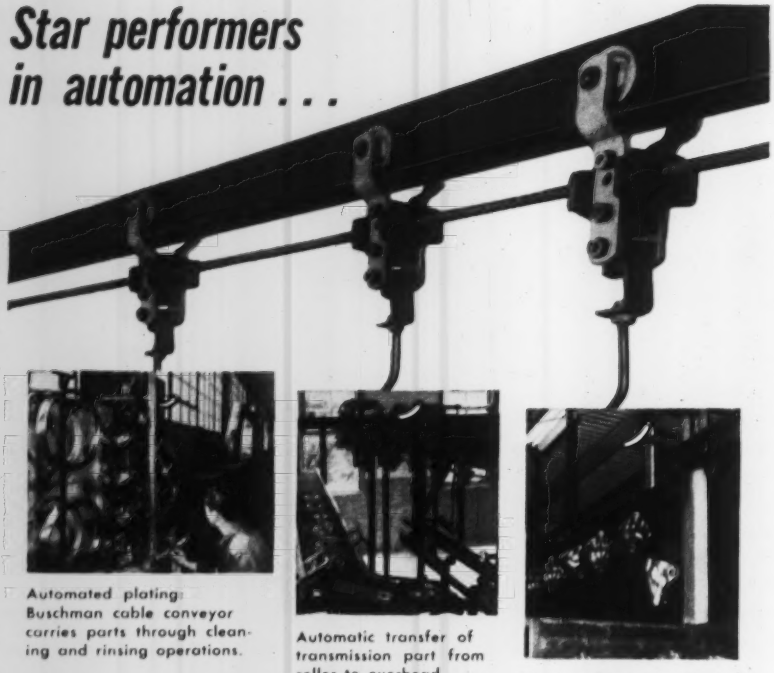
Star performers in automation . . .



Automated plating: Buschman cable conveyor carries parts through cleaning and rinsing operations.

Automatic transfer of transmission part from roller to overhead cable conveyor.

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. . . long have made Buschman "Universal" Cable Conveyors industry's first choice for everyday transportation of light and medium loads.

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Whether your problem involves automation or dependable everyday transportation, investigate the savings possible with Buschman. Remember . . . *when low-cost production is your goal . . . Buschman is your conveyor.* The E. W. Buschman Co., 4496 Clifton Avenue, Cincinnati 32, Ohio.

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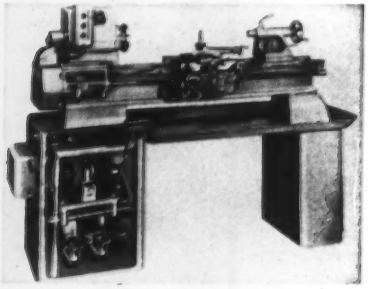
WORLD'S MOST COMPLETE LINE OF CONVEYING EQUIPMENT

BUSCHMAN CONVEYORS

NEW PRODUCTS and equipment

high speeds. A tachometer dial built into the headstock gives readings of spindle speeds.



A 2-hp, 3-phase motor powers the lathe through double V-belts. *Write*: Sheldon Machine Co. Inc., 4258 N. Knox Ave., Chicago 41, Ill. *Phone*: Mulberry 5-1970

Shell Core Blower

The Series 200 is a two station blow and dump machine that makes hollow cores automatically.

One side cures cores while the other side blows them.

Electrically controlled heater units assure the wall thickness desired. (450°F will cure a 1/16-in. shell in 15 seconds.) *Write*: Harrison Machine Co., 2734 Station Rd., Wesleyville, Erie, Pa. *Phone*: 8-3805

Greases

Protection against more than 100 corrosive agents and solvents is provided by the 5P line of specialized lubricants.

The greases are acid and alkali

MicroRold® STAINLESS SHEET

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up to 48" WIDE

BRIGHTER THAN EVER!—MicroRold stainless steel Type 430 in the NEW Bright Finish is now immediately available in sheets up to 48" wide offering new usefulness and economy in stainless fabrication. Produced with the same micro-accuracy of gauge for which MicroRold 36" is well known, Type 430 Bright up to 48" wide gives greater latitude in applications for quality stainless steel.

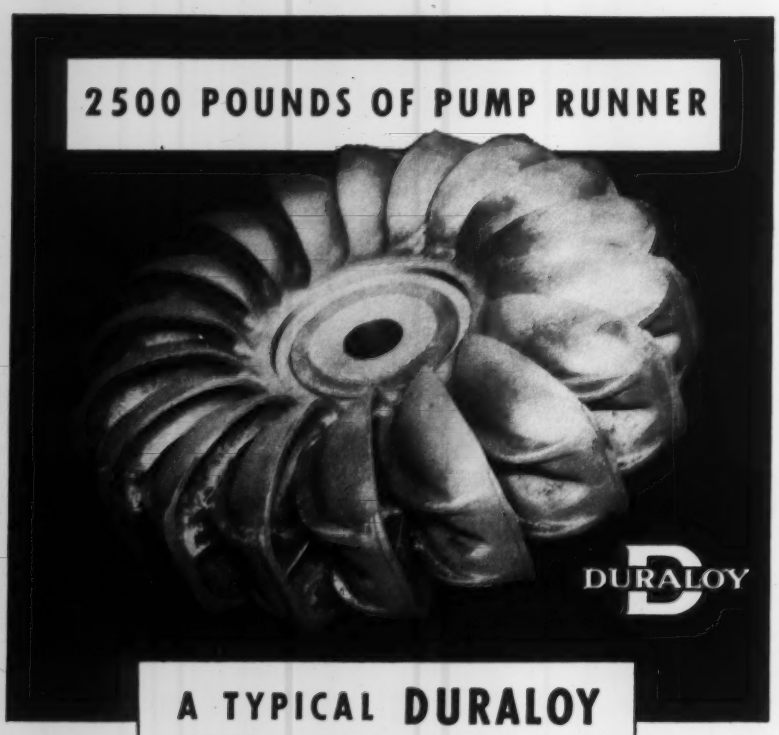
MicroRold 430 is also available in the regular commercial finishes and MicroRold stainless in other grades are now produced up to 48" wide. Complete details sent on request.

11-0

Washington Steel *Corporation*

WOODLAND AVENUE WASHINGTON, PA

2500 POUNDS OF PUMP RUNNER



A TYPICAL DURALOY HIGH ALLOY CASTING

This casting is 18-8, destined for use under quite corrosive conditions. It's typical of the work done in our modern foundry for both manufacturers who need high alloy castings for their equipment and for plant operators who need castings to meet a corrosion problem, a high temperature problem or a combination of both, with or without abrasion as a contributing factor.

We here at Duraloy now offer several distinctly different kinds of castings, all in the corrosion-resisting, heat-resisting or abrasion-resisting class and each kind offering certain distinct advantages:

static sand castings

centrifugal castings

shell molded castings

Shell molding offers great economy in the casting of small pieces on a large mass production basis.

Bring your high alloy casting problem to Duraloy both for recommendations as to the best alloying combination and for foundry services in casting and finishing the piece. Our recommendations and service are backed up by more than thirty years high alloy casting experience.

THE DURALOY COMPANY

OFFICE AND PLANT Scottdale, Pa.

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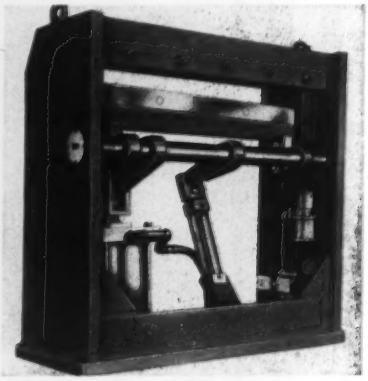
CHICAGO OFFICE 332 South Michigan Avenue

NEW PRODUCTS and equipment

resistant. Operating temperatures range from 0 to 350°F. ASTM penetration ratings are from 200 to 350. *Write*: Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 32, Pa. *Phone*: Radcliff 5-7473

Shears

Hot or cold metals, such as carbon steel, stainless, copper and aluminum, can be cut with this air-operated shear.



Models are available for cutting widths of 24 to 84 in. Mild steel strip up to 3/16-in. can be cut.

A choice of controls is offered: Hand operated, foot operated, automatic, air pilot or solenoid. *Write*: Curry Air Shear Corp., 941 Oliver Bldg., Pittsburgh 22, Pa. *Phone*: Atlantic 1-1370

Brazing Alloys

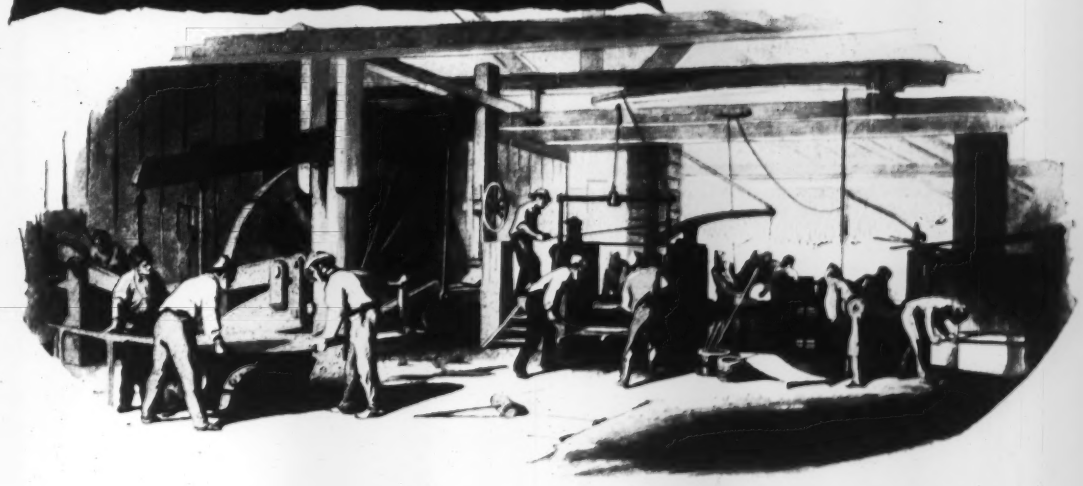
Joints with tensile strengths of 75,000 to 95,000 psi can be made with four high-nickel-content brazing alloys for high temperature and corrosion resistant service.

Their major use is in brazing austenitic stainless steel and high nickel, heat resistant and precipitation hardening alloys. They will also braze carbon steel and nonferrous metals with melting points above 1850°F.

Nickel content ranges from 72.50 to 83.25 per cent; silicon is between 3.50 and 5.00 per cent; and boron is between 1.90 and 3.50 per cent. Alloy designations (93, 91, 82 and 72) are based on approximate nickel content. Alloy 82 has a chromium content of 7.00 per

FAMOUS FIRSTS IN THE IRON & STEEL INDUSTRY

AMERICA'S FIRST IRON PLATE ROLLING MILL



Thirteen years after the War of 1812, Lukens Steel Company in Coatesville, Pennsylvania, was producing America's first rolled iron plates for boilers. Using tools and equipment that would seem exceedingly crude today, they rolled charcoal blooms into plates.

In 1825 the production of plates was limited to less than 34 inches width in this water-driven mill. Today, Lukens Steel Company has the country's largest plate mill, producing rolled plates up to 195 inches in width.

Another famous first in the iron and steel industry is BAKER'S MAGDOLITE, the original dead-burned dolomite. Ever since its beginning, BAKER'S MAGDOLITE has maintained a superior product. One that is always 5 ways better: Composition, Preparation, Strength, Economy and Quality. Order BAKER'S MAGDOLITE next time, and see for yourself how it delivers more uniform ingots, in greater numbers, and with less defective material.

5/55

ANOTHER FAMOUS FIRST

JEBCO PRODUCTS SINCE 1889

BAKER'S MAGDOLITE

The original dead-burned dolomite

THE J. E. BAKER COMPANY

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WHEELOCK, LOVEJOY & COMPANY, INC.
1855 So. Kilbourn Avenue, Chicago Illinois

WHEELOCK, LOVEJOY & COMPANY, INC.
265 Pennsylvania Avenue, Hillside New Jersey

WHEELOCK, LOVEJOY & COMPANY, INC.
12989 Greeley Avenue, Detroit Michigan

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You'll get quick action on your order for alloy steel bars, billets or forgings . . . no matter what size, shape or heat treatment you require . . . when you call any one of our seven warehouses.

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Or write today to our Cambridge office for your *free* Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson - Newbould, Ltd., Montreal and Toronto

WHEELOCK, LOVEJOY & COMPANY, INC.
144 Milton Street, Buffalo New York

WHEELOCK, LOVEJOY & COMPANY, INC.
4524 W. Mitchell Avenue, Cincinnati Ohio

HOME OFFICE:
WHEELOCK, LOVEJOY & COMPANY, INC.
131 Sidney Street, Cambridge 39 Massachusetts

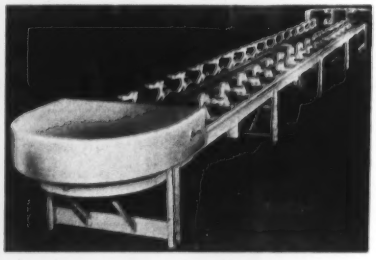
NEW PRODUCTS and equipment

cent, and 72 has 15.00 per cent chromium.

All are available as cast rod, powder and resin-bonded sheet, as well as sintered forms. *Write*: Handy & Harman, 82 Fulton St., New York 38, N. Y. *Phone*: Beekman 3-2460

Platen Conveyors

The Carrousel provides automatic indexing and adjustable dwell for assembly, inspection or light machining operations.



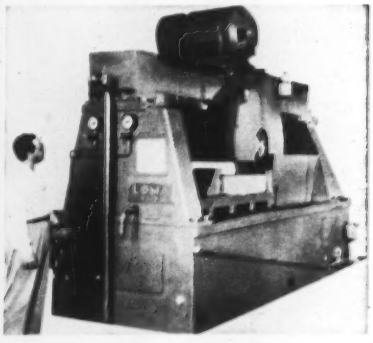
The 10 x 12 in. carrier platens support up to 100 lb. They are on 12-in. centers. Conveyor lengths go up to 100 ft in 10-ft increments. The working height of 38 in. can be adjusted 2 in. up or down. *Write*: Visi-trol Engineering Co., 9345 Hubbell, Detroit 28, Mich. *Phone*: Vermont 6-9765

Ingot Saw

Short, last and first ends of ingots can be cut with this hydraulic saw.

The carriage travels on a crossbeam above the ingot; this protects the motor, carriage, saw blade drive and feed cylinder from chips.

The cycle is controlled from the operator's station behind the wide

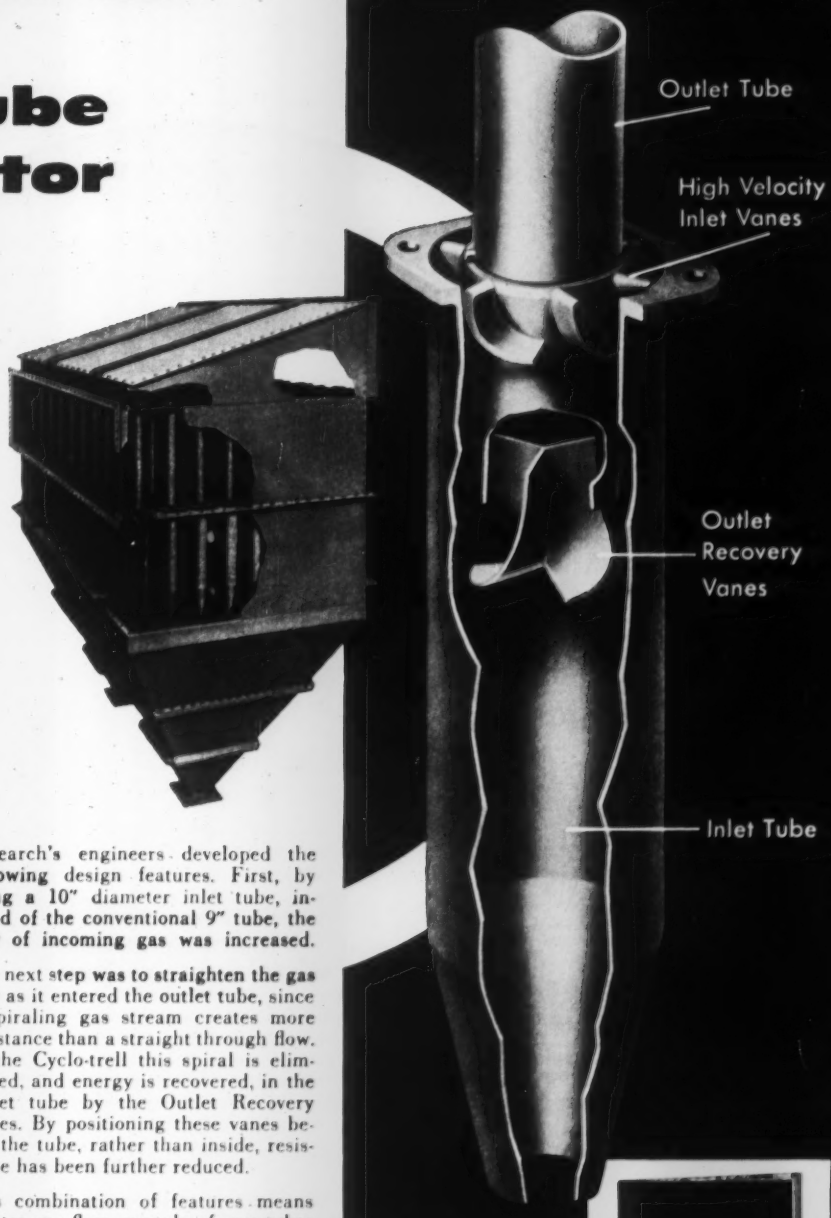


NEW Cyclo-trell

multiple tube dust collector

Here are a few brief facts on Research's new multiple tube mechanical collector.

- Collection efficiencies are higher, for a given pressure drop, than other conventional multiple tube collectors.
- Gas flow per tube is higher than conventional units. This means fewer tubes per collector and lower total cost for a given capacity.
- Cyclo-trell's design is based on Research's 45 years experience in manufacturing gas cleaning equipment. As the largest manufacturer of electrical precipitators in the world, Research-Cottrell has engineered and built many combination units consisting of precipitators and mechanical collectors.



Higher Collection Efficiency

An important reason for Cyclo-trell's higher collection efficiency is the aerodynamically shaped inlet vane unit. The purpose of these vanes is to produce a fast spiral of incoming gas. The faster these gases spin, the greater the centrifugal force on the suspended dust.

After testing many types and curvatures of vanes, Research found that this new design resulted in less turbulence, greater centrifugal force and higher collection efficiencies.

Greater Gas Handling Capacity

To develop a higher gas flow capacity than other multiple tube collectors, Research's engineers developed the following design features. First, by using a 10" diameter inlet tube, instead of the conventional 9" tube, the flow of incoming gas was increased.

The next step was to straighten the gas flow as it entered the outlet tube, since a spiraling gas stream creates more resistance than a straight through flow. In the Cyclo-trell this spiral is eliminated, and energy is recovered, in the outlet tube by the Outlet Recovery Vanes. By positioning these vanes below the tube, rather than inside, resistance has been further reduced.

This combination of features means greater gas flow per tube, fewer tubes per collector and a lower total cost for a given capacity and efficiency.

Bulletin M gives complete details on design features, efficiency, capacity and detailed dimensional drawings. Write for your copy today.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, N. J. • 405 Lexington Ave., New York 17, N. Y. • Grant Bldg., Pittsburgh 19, Pa. • 228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Cal.

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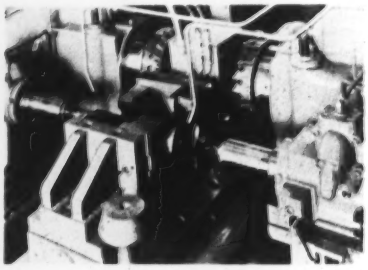
crossbeam support. Cutting can be seen through the window. *Write*: Loam Machine Mfg. Co., 114 E. 32nd St., New York 16, N. Y. *Phone*: Murray Hill 5-6410

Transfer Milling Machine

The in-line transfer principle is used by this milling and centering machine. Opposed milling heads and drill heads are mounted on ways on either side of the fixture table.



Cycle of the double-end unit is automatic except for loading and unloading. *Write*: Machinery Mfg. Division, Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, O. *Phone*: Utah 1-1515

Hydraulic Fluids

These fire-resistant fluids, 150-CP and 275-CP, are corrosion and wear resistant. They're for use in diecasting machines, ingot manipulators, furnace controls, electric welders and other industrial machines.

Ordinary filters can be used. Leakage losses are low. The fluids have no harmful effects on packings or seals and have excellent shear stability, high viscosity indexes and low pour points. *Write*: Carbide & Carbon Chemicals Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

Vibratory Feeder

Model FE ¼ is for accurate feeding operations where small amounts of materials are involved. The feed rate is controllable up to 500 lb of sand an hour.

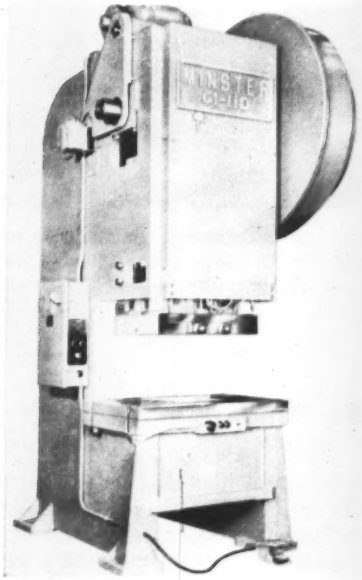
The electro-permanent magnetic feeder operates on alternating cur-

rent and is used with packaging and weighing machines. *Write*: Eriez Mfg. Co., Erie 6, Pa. *Phone*: 4-0133

Gap Press

Design and construction assure minimum deflection when this press is loaded to capacity (110 tons).

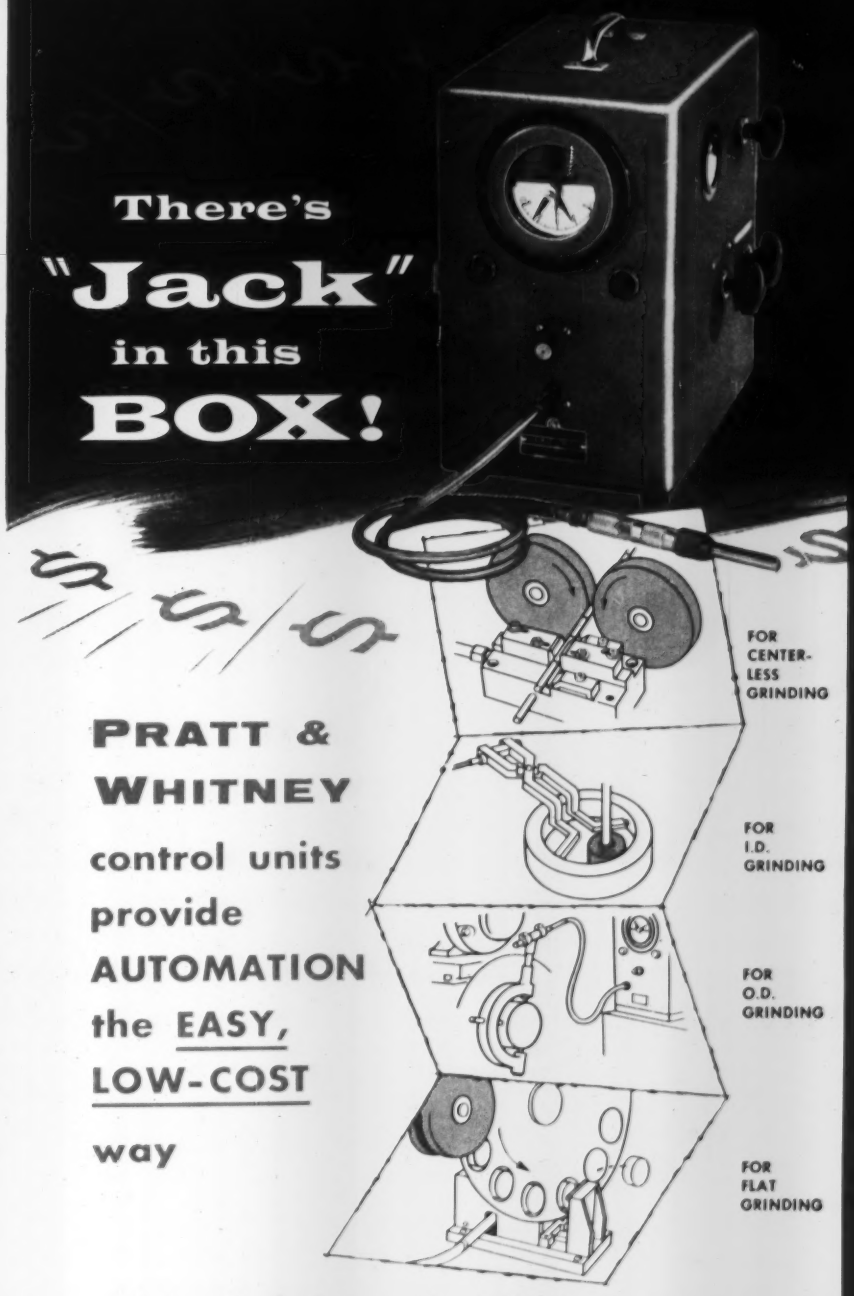
Slide to bed parallelism is maintained by long press gibs and bronze lined ways on the cast slide.



Variable speed operation is offered with a standard 5-in. stroke. *Write*: Minster Machine Co., Minster, O.

Glass Cloth Tape

Permacel 621 is a flame resistant tape with an average tensile strength of 150 lb per inch. It's



Increased production . . . reduced reject losses . . . greater accuracy! These are the profitable advantages you get through Automatic In-Process Gaging. And now, *standard, on-the-shelf* Pratt & Whitney Control Units . . . plus a minimum of special gaging fixtures . . . can give you an in-process gaging installation exactly tailored to *your* needs *without* the long delays and heavy expenses involved in engineering and constructing special equipment.

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PENN BOLT AND NUT CO. P.O. BOX 9967, PITTSBURGH 33, PA.

NEW PRODUCTS and equipment

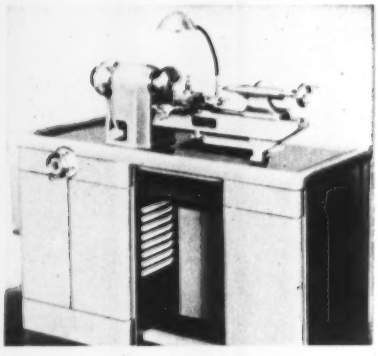
for sealing and binding joints in hot air ducts, sealing and protecting ducts or pipes carrying high temperature exhaust fumes and for flameproof identification markings.

The tape is made of a flameproof glass cloth backing and a rubber base adhesive that will extinguish itself when a flame source is removed.

The tape comes in 60-yard rolls of assorted widths. *Write*: Permacel Tape Corp., New Brunswick, N. J. *Phone*: Charter 7-7900

Bench Lathe

Model 73 has a hardened and ground bed, an enclosed headstock with a 1-in. collet capacity and a 7-in. swing.

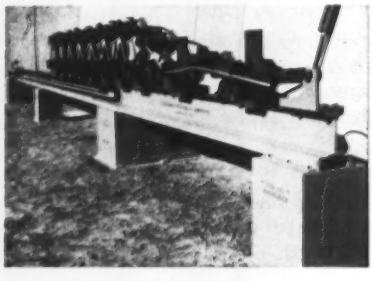


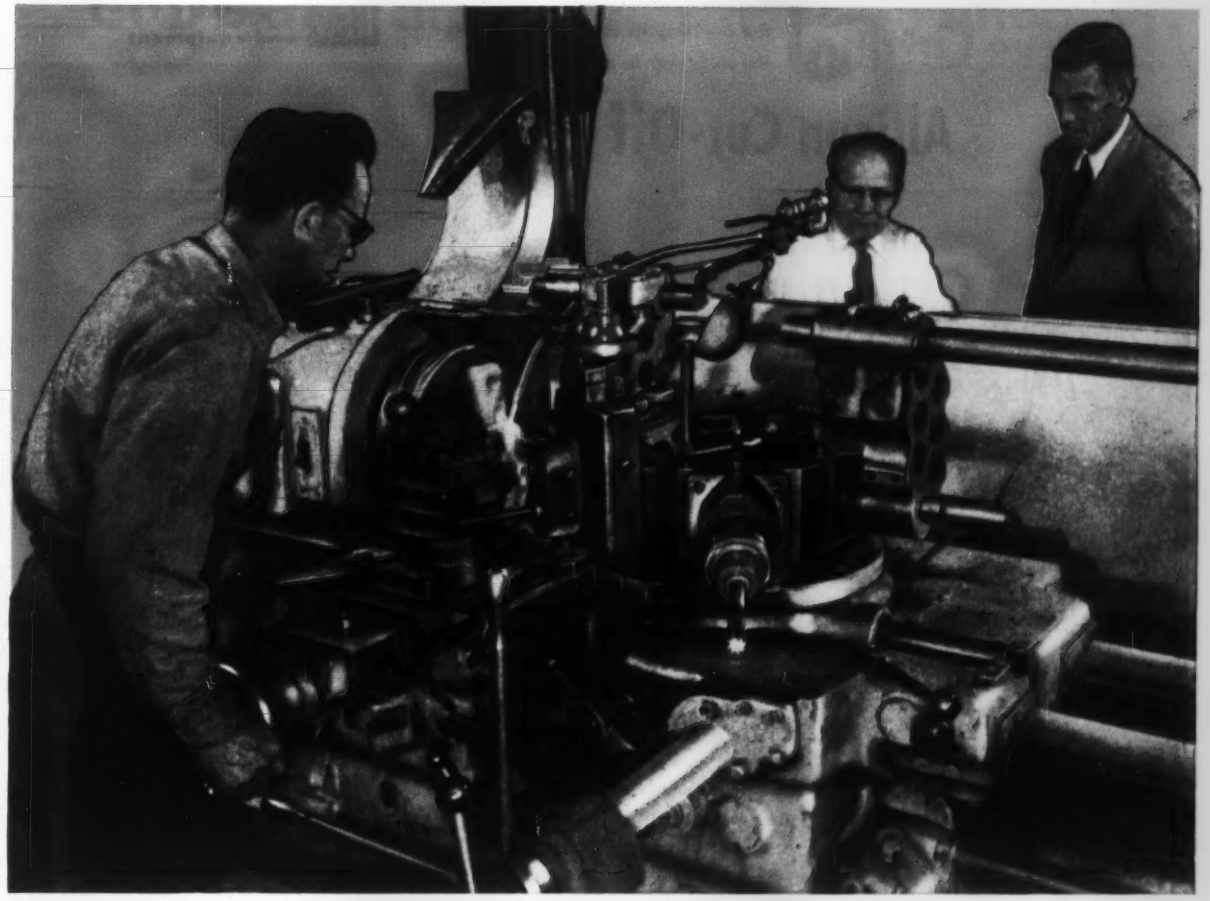
A variable speed drive provides an infinite range from 100 to 3500 rpm. *Write*: Wade Tool Co., Waltham, Mass. *Phone*: Twinbrook 4-1050

Bar Bender

Model VS-3D is a bar joist web bending machine that can do many other jobs with the addition of arm inserts.

In 30 seconds, the machine bends





Shop Superintendent Bonnafe and Gulf Sales Engineer G. R. Burnham check on performance of Gulfcut 51A as turret lathe turns a stainless steel drive roll for a wire belt.

"Gulfcut gives us longer tool life,"

says Joseph Bonnafe, Shop Superintendent, J. W. Greer Company, Wilmington, Mass.

Shop superintendents like Mr. Bonnafe, engineers and machine tool operators *know* that production can be improved and costs lowered through the use of cutting oils designed specifically for the job. And, they know they can get the right oil for *every* job from the complete line of Gulfcut Oils. Reports like these come from the field every day:

From an aluminum plant: ". . . stepped up production of aluminum caps 25%, increased tool life well over 100%, and we're getting better threads."

From a plant working tough titanium-alloy stainless steels: ". . . results were phenomenal. Tool life increased over 40% and surface finish was improved 43 microns."

Your Gulf Sales Engineer can pin-point your cutting oil requirements—can help you improve shop efficiency through the use of the most suitable cutting oils for your needs. Contact him today at your nearest Gulf Office.

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Allison Cut-Off Wheels

Wide variety of shapes and materials cut with abrasive wheels

• Speed and quality of cut make abrasive cutting ideal for a wide range of operations. For example: one inch diameter cold rolled steel can be cut with a wheel cost of under ½ cent per cut and in 3 seconds.

ALLISON Cut-Off Wheels can provide smooth, high-quality cutting for almost any type of material however hard. These include steels of practically all analyses including corrosion-resisting types, brass, bronze, Monel Metal and other non-ferrous: aluminum alloy, magnesium and many others.

Whatever the problem there is an Allison Wheel to meet it . . .

Profitable abrasive cutting means using the right abrasive wheel . . . and the proper abrasive cut-off machine . . . for the specific job. If the required result is a smooth, fine finish, without hardening or metallurgical changes, a WET cut is called for. Rubber bonded ALLISON Wheels give long wheel life and high quality cuts for such an operation. If the cut is a big one (over 2" solid) an OSCILLATING Cut-Off machine . . . with the proper ALLISON Wheel . . . will do the job fast and economically. Where quality requirements are less exacting, dry cutting with ALLISON resinoid bonded wheels is often the best method.

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Consult a specialist for best results

• ALLISON specializes in the manufacture of abrasive cut-off wheels. Be sure that you are getting the most from your cutting methods. Abrasive wheel cutting is faster than sawing—in some cases it is 10 to 20 times as fast. The savings in cost can be tremendous. Why not let an ALLISON abrasive cutting specialist check your hardest cutting job?

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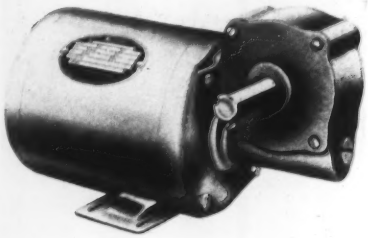
NEW PRODUCTS and equipment

center web sections for open web joist assembly. A gearmotor drives the power train. *Write*: Bidal Mfg. Co., P. O. Box 1299. Albuquerque, N. Mex.

Gearmotors

Full starting torque and adjustable running torque are provided by this line of gearmotors and electric motors.

Output torque is adjustable from 0 to 1000 in.-lb at 100 rpm.



The motor can be made to cut off at a predetermined overload. It is available in instantly reversible models. *Write*: Brown-Brockmeyer Co., Dayton 1, O. *Phone*: Madison 5661

Index Machine

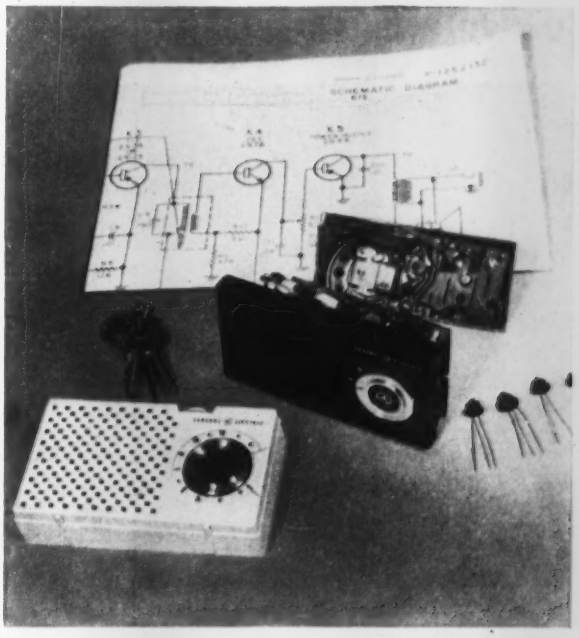
This eight-station rotary machine does more than 20 operations on compressor crankcases for air conditioners.

The machining cycle is automatic, including clamping and unclamping. Operations include rough boring, counterboring, facing, spot facing, drilling, chamfering, back chamfering and tapping.

Three types of crankcases can be machined. Average production is 87 pieces an hour. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

G. E. plates circuits with "Plus-4" Anodes

G-E "Thru-Con" Printed Circuit Boards offer positive connection through the holes without staking pins. Patterns on both sides if needed. Printed circuitry cuts assembly time; cuts product bulk, weight; reduces inspection time.



This transistorized portable radio features a full printed circuit using a General Electric "Thru-Con" Board. Combining other advances in electronics with the printed circuit makes possible sweeping changes in size, weight, and styling.

A new 75-foot automatic acid-copper electroplating tank is the key to the highly mechanized production system in which General Electric will produce some 6,000,000 of its "Thru-Con"—additive-type printed-circuit boards for everything from transistorized portable radios to street light controls.

Plastic strips, with wiring patterns printed in a microscopic layer of silver, as a conductive coating for acid-copper plating, run through the tank several thousand at one time, in racks suspended from a conveyor.

The tank holds 850 3½" x 1½" x 42" long oval anodes in three parallel rows. It is filled with a standard 30/7 copper sulfate solution. Current input is 25,000 amps—15,000 amps in series through the outside rows and 10,000 amps through the center row.

General Electric tested several different kinds of anodes—is now using Anaconda "Plus-4" (Phosphorized Copper) Anodes. These are the comments on their performance:

1. No sludging.
2. Minimum copper build-up in solution. Better than with any other anode tried.
3. Smooth, heavy deposit.
4. There is a greater cathode deposit. Scrap losses are considerably under those anticipated.
5. Throwing power is excellent, producing uniform plating, even inside holes in the plastic strips, for positive electrical connections.

See for yourself how Anaconda "Plus-4" Anodes can simplify acid-copper electroplating, reduce your costs. Write for information on how you can get a test quantity to supply one tank. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

"Plus-4" Anodes

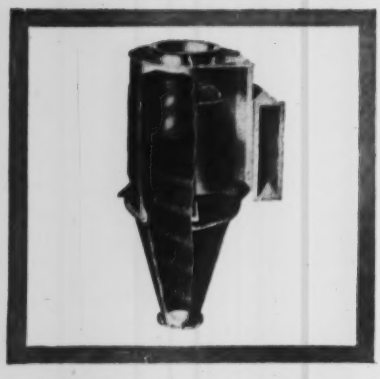
(Phosphorized Copper)

A product of **ANACONDA®**

Made by The American Brass Company

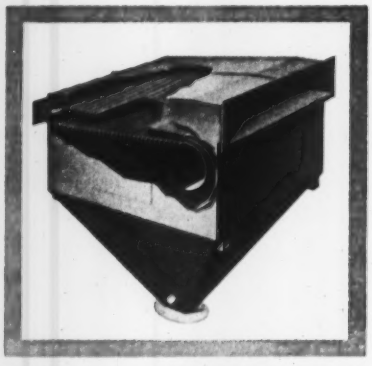
For use under U. S. Patent No. 2,689,216

How Buell's Exclusive Rapping Mechanism delivers Extra Dust Collection Efficiency



Buell Cyclones offer two "extra-efficiency" advantages: (1) exclusive Shave-off which harnesses double-eddy and puts it to work, and (2), large diameter design which eliminates clogging.

Complementing the extra efficiency of rapping in Buell "SF" Electric Precipitators, the unique Spiralectrodes add further efficiency through 50% to 100% higher electron emission, constantly accurate spacing, longer electrode life.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for natural or forced draft installations. Ideal for boilers from 100 to 2000 BHP.

For more specific data about Buell's *extra efficiency*, write Dept. 26-K.
Buell Engineering Company,
70 Pine Street, New York 5, N. Y.

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MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in
DUST COLLECTION SYSTEMS

NEW Literature

Write directly to the company for a copy

Flexible Chain Couplings

Here's a 16 page bulletin, C45-56, that gives specifications, dimensions, ratings and uses of couplings. Industrial Sales Division, Morse Chain Co., Ithaca, N. Y.

Sleeve Bearing Lubrication

A mixture of oil and cellulose fibers that combines wicking and oiling into one fluid form is described in an 8-page bulletin. Fluidwick Co., 5319 E. Outer Drive, Detroit 34, Mich.

Records Control

Bulletin BSD 45, 8 pages, outlines steps for improving record management. Remington Rand Division, Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y.

Motor Crane

A 35-ton crane with a boom that can be extended to 170 ft is described in a 16-page bulletin. Thew Shovel Co., Lorain, O.

Power Lubrication

Bulletin 811 describes centralized lubrication systems with manual and mechanical or electric automatic control. Lincoln Engineering Co., 5702-33 Natural Bridge Ave., St. Louis 20, Mo.

Speed Reducers

Gearmotors, motor reducers and speed reducers are depicted in this 12-page bulletin. Sterling Electric Motors Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.

Mill Contactor

Heavy duty, direct current mill contactors for steel mills are presented in bulletin 14B6505B, 8 pages. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Conveyor Chain

Bulletin 56-73, 4 pages, describes a chain for handling cartons, cases, crates and cans. Department P.R., Chain Belt Co., Milwaukee 1, Wis.

Leveling Jacks

This 4-page bulletin describes jacks that provide positive leveling adjustment. Applications include production machines, toolroom equip-

There are 69 reasons why

—Diehl can build better motors. For 69 years, successive generations of Diehl motor specialists have applied their accumulated know-how to solving the power problems of widely divergent types of industries. In the smallest shops or the largest plants—all over America—Diehl men study the problem along with the customer. Name your motor requirements—no matter how "different," it's more than likely that an almost-similar situation has been recently brought to a successful conclusion with Diehl action. Here's where Diehl know-how helps you. The right answer and the right motor—*at the most reasonable cost*—can be yours, fast! Designed and built for your job. Get all the power and get it right—from Diehl.

You invest in Performance

when you design with DIEHL.

Diehl

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Electrical Division of THE SINGER MANUFACTURING COMPANY
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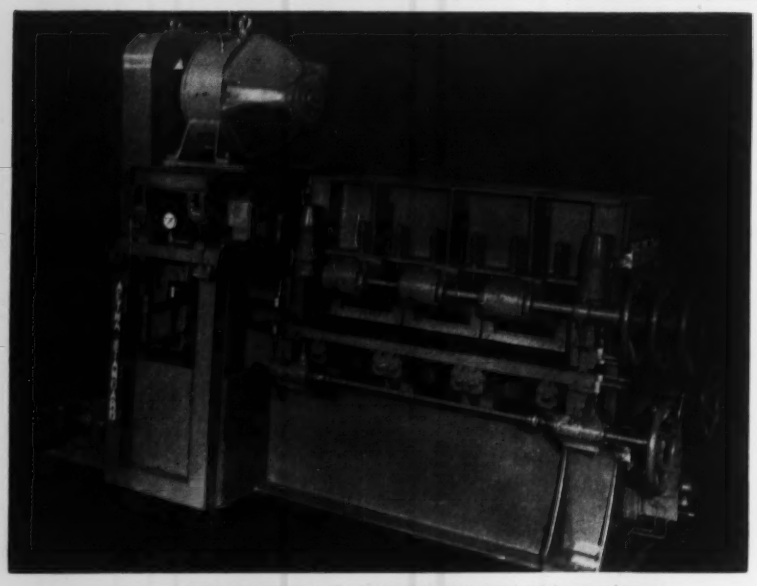
INTEGRAL AND FRACTIONAL HORSEPOWER MOTORS ARE AVAILABLE IN A WIDE RANGE OF TYPES AND SIZES

BEARING TIPS by McGill



138 GUIDEROL® BEARINGS BACK UP WORK ROLLS IN AETNA STANDARD LEVELER

High load capacity vital to back-up roll support

For processing 16 to 30 gauge steel sheets and coils, this Roller Leveler built by Aetna Standard Engineering Company requires dependable components to deliver a consistent maximum output at speeds up to 400 feet a minute.

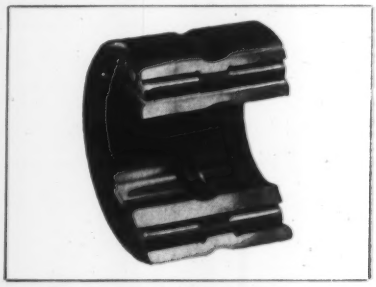
McGill GUIDEROL GR-16 bearings were selected for this machine and several larger versions use GR-24 and GR-36 bearings. They can carry the heavy irregular loads associated with flattening and leveling steel sheets and strips. Requiring less radial space, Guiderol bearings provide maximum roll neck diameters and offer greater strength at the necks of larger back-up rollers.

On the machine shown above, there is a total of 36 back-up rollers in 3 upper banks and 33 in 3 lower banks to resist the heavy pressure of the 48 inch working rolls. With a GUIDEROL bearing at each end of the 1¾" back-up rolls, a total of 138 bearings is required for the Leveler. These bearings have proved especially suited to supporting heavy loads longer in small radial space with reduced maintenance and production down time — important in steel mill operations.

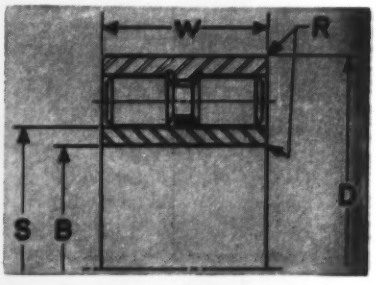
American Hoist Uses CT Series In Crane Blocks

Crane Blocks built by American Hoist and Derrick to withstand the greater strains and rough usage of lifts up to 500 tons rely on the greater capacity of GUIDEROL CT Series bearings in the sheaves. Interchangeable with retainer type cylindrical roller bearings, the CT Series full type roller construction has added capacity of over 38%. In sheaves these bearings offer greater angular stability with full race width rollers. Center guiding without retainer keeps these rollers aligned and prevents binding under eccentric loads.

Center-Guided Rollers Eliminate Load Wasting Cages



Guiderol Bearings inherently possess exceptionally high radial load capacity due to their full complement of small diameter rollers. Grooved rollers and a center guide rail keep rollers aligned as insurance against skewing and binding that is possible with ordinary needle bearings. Sizes interchange with needle and cylindrical roller bearings.



CT Series Adds Guided Roller Advantages to Cylindrical Roller and Ball Bearing Sizes

CT Series Guiderol Bearings provide the load carrying advantages of center guided rollers in cylindrical roller and ball bearing sizes. They are interchangeable in both single and double row dimensions. Inner rings are separable and may be eliminated to reduce radial space.

140 Pages of Bearing Facts

Write for your copy of Catalog No. 52, a revised 140-page Bearing Selection Guide. It contains vital product information and 30 pages of engineering data.

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Full Type Roller Bearings

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ment, industrial furnaces, large surface plates and assembly fixtures. Enterprise Machine Parts Corp., 2731 Jerome & McNichols Rd., Detroit 12, Mich.

Toggle Headers

Bulletin 854-A-4, 8 pages, presents machines for upsetting heads on screw and rivet blanks and forming tubular rivet blanks. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Process Control

Pneumatic instruments for process control are discussed in bulletin 505, 16 pages. U.S. Gauge Division, American Machine & Metals Inc., Sellersville, Pa.

Belt Grinders

This 4-page bulletin describes abrasive belt machines for high volume flat surfacing of ferrous and nonferrous metals. Engelberg Huller Co. Inc., 831 W. Fayette St., Syracuse 4, N. Y.

Steel Descaling

A 2-page folder describes the descaling of hot-rolled sheet steel and strip, slabs, billets and plates. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Transformer Instruction

This 80-page booklet, 427-R-1, covers maintenance and operation of power transformers in all ratings. Advertising Department, Moloney Electric Co., 5390 Bircher Blvd., St. Louis 20, Mo.

Marking Machine

Here's a 4-page bulletin that describes a hydraulic marking machine for production line use. Parker Stamp Works, Franklin Ave., Hartford, Conn.

Control Valves

Bulletin LB-2, 12 pages, details construction and operating characteristics of 1 to 4-in. control valves. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Truck Attachments

This 4-page bulletin describes load clamp, side shift and rotating attachments for powered industrial trucks. Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.

Boiler Water Control

A 35 per cent hydrazine solution for removing dissolved oxygen from boiler feedwater is described in a 16-

look at these advantages of

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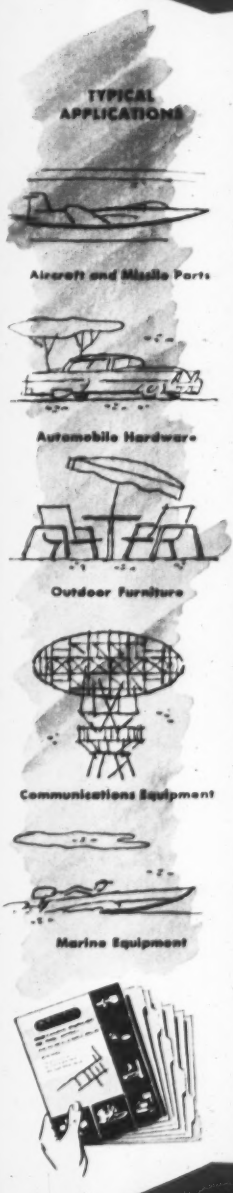

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Either coating provides corrosion resistance superior even to complicated electrolytic treatments in a fraction of the time. These coatings also offer many other valuable characteristics: they have low electrical resistance, they aid in arc-welding, provide a good base for bonding compounds, have no effect on the dimensional stability of close-tolerance parts. Final appearances ranging from clear through yellow iridescence to full brown can be obtained. By dyeing, you can produce red, green, blue, orange or yellow finishes.

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Produces a protective, paint base film with corrosion resistance at least equal to that obtained from long, high-temperature dichromate treatments in a fraction of the time and at room temperature. The appearance of the coating can be varied from light brown to dark brown and black.

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NEW LITERATURE

page bulletin. Industrial Chemicals Division, Olin Mathieson Chemical Corp., Baltimore 3, Md.

Miniature Thermocouples

Here's a 6-page bulletin telling how gasket thermocouples are used to measure skin temperatures. Thermo Electric Co. Inc., Rochelle Park Post Office, Saddle Brook, N. J.

Annunciator Systems

A complete line of annunciators—tools for indicating offnormal operating conditions—is detailed in a 32-page catalog, 100B. Panalarm Division, Panellit Inc., 7401 N. Hamlin Ave., Skokie, Ill.

Notching and Punching

Bulletin 79-D describes an air powered notching and punching machine used in sheet metal operations. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 4, N. Y.

Turret Drill

Time saving advantages of a turret drilling machine are related in this 20-page bulletin. Howe & Fant Inc., 20 Fitch St., East Norwalk, Conn.

Mechanical Comparator

A portable instrument for close tolerance inspection is presented in an 8-page bulletin. Pratt & Whitney Co. Inc., Charter Oak Blvd., West Hartford 1, Conn.

Battery Chargers

Bulletin GEA 6525, 4 pages, gives information on metallic rectifier battery chargers for motorized hand trucks. General Electric Co., Schenectady 5, N. Y.

Arc Welder

This 20-page bulletin describes heads for submerged arc welding. Lincoln Electric Co., Cleveland 17, O.

Flow Rate Measurement

Bulletin SC-1022, 8 pages, describes a device which indicates flow rates of air and gases. Selas Corp. of America, Dresher, Pa.

Aluminum Casting Alloys

The characteristics and behavior of aluminum alloys are given in this 61-page data book. Department M1, Alloys & Chemicals Mfg. Co., 4365 Bradley Rd., Cleveland 9, O.

Pyrometers

Bulletin C 93-1, 24 pages, describes radiation detectors with an average speed of response of less than 0.5 second for a 90 per cent change in

temperature. Industrial Division, Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Philadelphia 44, Pa.

Miniaturization

This booklet shows how knowledge of fastener fatigue enables designers to get more usable strength per pound of bolting. Standard Pressed Steel Co., Jenkintown, Pa.

Chaplets

Bulletin 56, 12 pages, lists radiator, motor, boiler, single-head and perforated chaplets. Cleveland Chaplet & Mfg. Co., 26470 Lakeland Blvd., Cleveland 32, O.

Automatic Tooling

Bulletin 500, 4 pages, describes tooling for automatic assembly operations. Hicks Development Division, Ferguson Machine Corp., P.O. Box 350, Lebanon, Ind.

Photoelectric Controls

This 16-page bulletin describes the industrial uses of photoelectric equipment. Autotron Inc., Box 722-U, Danville, Ill.

Air Pollution

Methods used in the study of air pollution are discussed in a 4-page bulletin. Hemeon Associates, 121 Meyran Ave., Pittsburgh 13, Pa.

Welding Electrodes

Bulletin EW-195, 28 pages, lists uses, procedures, recommended currents, physical properties and sizes of 44 types of electrodes. Hobart Bros. Co., Hobart Square, Troy, O.

Bronze Bearings

Catalog 56, 33 pages, lists almost 2000 sizes of oil cushion bearings. Beemer Engineering Co., 401 N. Broad St., Philadelphia, Pa.

Seamless and Welded Pipe

Dimensions, weights, specifications, grades and analyses of carbon, alloy and stainless steel pipes are given in bulletin 138 B, 4 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Temperature Controls

Bulletin MC-135, 6 pages, presents performance and specification data of precision thermostats. Fenwal Inc., Ashland, Mass.

Radiation Gages

Noncontacting gages that measure strip as it is being produced by a continuous process are described

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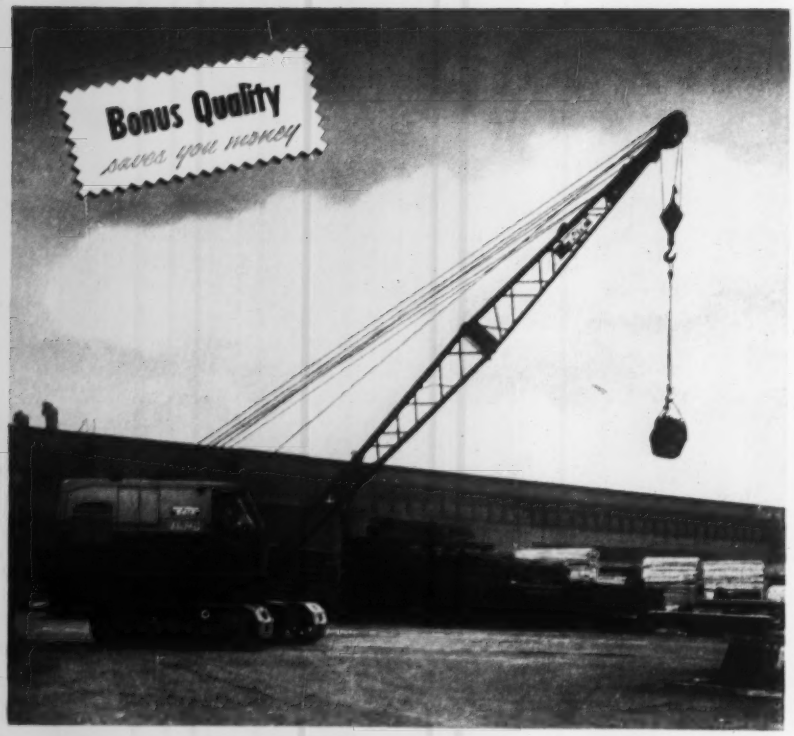

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For extra speed and convenience, jib extensions can be connected without removing sheaves, guards, suspension ropes, or any of the boom-point machinery.

This is just a sample of the advantages Bucyrus-Erie cranes offer. See your nearby Bucyrus-Erie distributor soon, and find out how these machines can cut YOUR handling costs.

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Bonus Quality For chemical analysis of steel and other materials, Bucyrus-Erie's laboratory has the finest scientific equipment, including the *spectrophotometer* shown here. This apparatus analyzes the elements in steel by measuring the degree to which a steel solution absorbs certain waves of light. Both the presence of elements and their exact quantities can be determined by this extremely sensitive instrument.

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NEW LITERATURE

in a 12-page bulletin. Pratt & Whitney Co. Inc., Charter Oak Blvd., West Hartford 1, Conn.

Furnace Atmospheres

Infrared equipment which monitors the CO, CO_2 or CH_4 content of furnace gases is discussed in bulletin N-91-620(1), 8 pages. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Glass-to-Metal Seals

Here's a 4-page bulletin that describes five steels used for glass-to-metal seals. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Dry Grinding Mills

Catalog 17-C, 44 pages, considers the selection of conical, tricone, cascade, rod, tube and disc roll mills for dry grinding. Hardinge Co. Inc., 240 Arch St., York, Pa.

Press Unloader

Here's a 4-page bulletin that describes a straight-line press unloader for stamping and forging press automation. Press Automation Systems Inc., 18616 Wyoming Ave., Detroit 21, Mich.

Tubing

Bulletin 2, 3 pages, describes tubes made of stainless steels, alloy steels beryllium copper and titanium. Superior Tube Co., 1585 Germantown Ave., Norristown, Pa.

Precision Casting

The Shaw process for making investment castings that weigh up to 1000 lb is described in a 27-page bulletin. Refractory molds are used. Department PR-10, Shaw Process Development Corp., 80 Shore Rd., Port Washington, N. Y.

Dry Acid

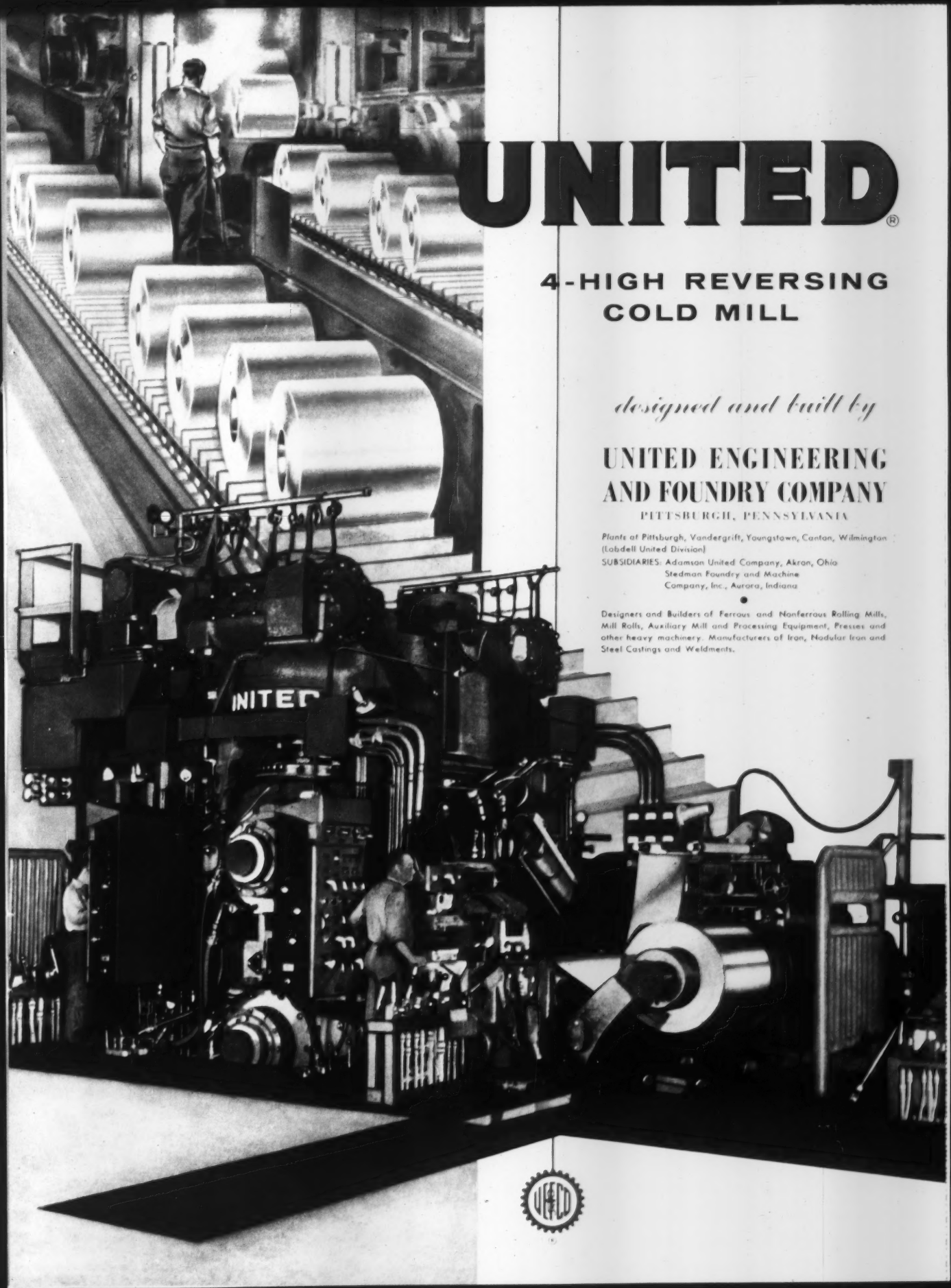
Bulletin 43, 2 pages, describes a powdered material used in solution for acid dipping and pickling ferrous and nonferrous metals. Mac Dermid Inc., Waterbury, Conn.

Surface Thermometer

Bulletin 2P756, 2 pages, describes a test instrument that gives temperature readings from 0 to 650°F on 1 second contact. Royco Instruments, 895 Arthur St., Albany, Calif.

Crankshaft Grinding

Bulletin ESA-263, 4 pages, describes wheels for grinding automotive crankshafts. Simonds Abrasive Co., Tacony & Fraley St., Philadelphia 37, Pa.



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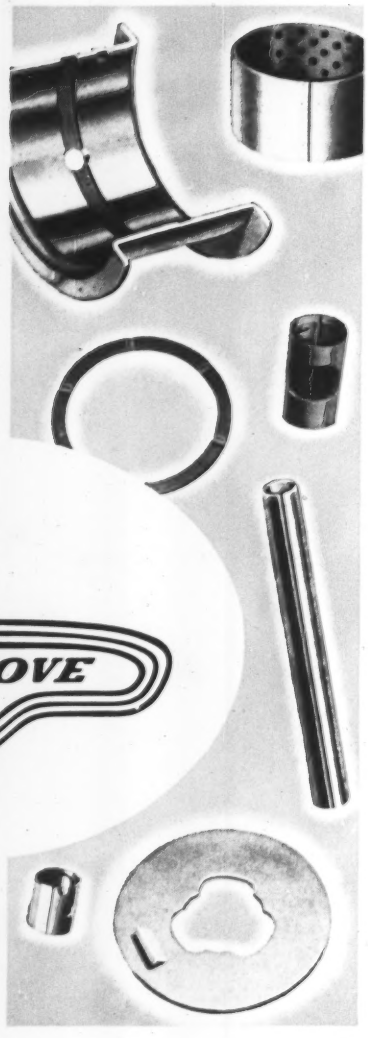

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Market Outlook

PRESSURE continues to build up for steel price increases.

You can see that in what steelmakers are saying. C. M. White, chairman, Republic Steel Corp., Cleveland, pointing out that steelmaking costs are climbing, says "price increases are needed now." Stewart J. Cort, vice president, steel division, Bethlehem Steel Co., Bethlehem, Pa., comments that the freight rate increases the railroads have asked would cost his company a great amount of money. He declines to name the amount, but says it has been computed. The increased cost to the steelmakers would be reflected in increased steel prices, he predicts.

Charles Lukens Huston Jr., president, Lukens Steel Co., Coatesville, Pa., forecasts a new round of increases in steel prices—early in 1957, perhaps.

IN SAME BOAT— U.S. Steel Corp., which sets the price pace by virtue of being the largest steel producer, has been a reluctant mover—principally because it is the pace setter. It, however, is facing the same rises in costs that confront other producers.

LESS CONSTRAINT— There is one less compulsion to hold the price line—the national election is over. One of the major requisites for price strength is a strong demand for steel. This we have. It may even strengthen, what with the tense international situation that will spur the ship and oil industries, to say nothing of the others which may feel the impact. Even without demands stemming from the international crisis, metalworking men expect their 1957 business to exceed that of this year.

OUTLOOK— All this spells a strong demand for steel in 1957. Steel producers didn't cut prices in 1954 when demand slumped. If prices could be sustained then, there's only one way they'll go now if there's any movement. And that's up.

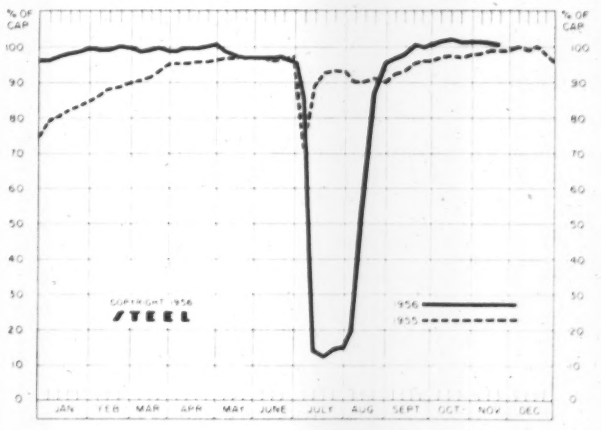
First to feel the effects of the international tension is steel plates. There is pressure for faster deliveries, especially for repairs to Navy ships being taken out of "moth balls" and readied for service. Plate producers are co-operating wherever possible, although rolling schedules are so tight it is difficult to alter delivery promises over the next few weeks. Plates have been one of the steel products in strongest demand, and an increased rate of shipment has been unable to fill the needs. By the end of this month, the mills will have shipped as many tons of plates this year (despite the steelworkers' strike) as they did in all of 1955.

FOR DEFENSE— Most plate producers are still proceeding on the assumption that first-quarter set-asides for rated requirements of carbon plate will be around 10 per cent, as the government specified early in October.

FULL SPEED— Steel plants continue to run a fraction above their Jan. 1 rated capacity. In the week ended Nov. 18, they produced steel for ingots and castings at 100.5 per cent of capacity. In the preceding week they ran at 101 per cent.

BULLISH— The steel scrap market continues to reflect expectations of a high rate of steel production. In the week ended Nov. 14, STEEL's price composite on steelmaking scrap rose to $61.50 a gross ton, a new record.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 18	Change	Same 1955	Week 1954
Pittsburgh	99	— 2*	102	76
Chicago	100	+ 0.5*	99	85.5
Mid-Atlantic	102	0	98	71
Youngstown	104	+ 3	100	82
Wheeling	101.5	+ 0.5	100	92
Cleveland	103	+ 4*	100	88
Buffalo	107.5	0	105	97.5
Birmingham	95.5	0	94.5	64
New England	87	0	90	58
Cincinnati	96.5	+ 2.5	92.5	76
St. Louis	106	— 1	90.5	83.5
Detroit	100	— 1	98	80
Western	109	0	99	86
National Rate	100.5	— 0.5	99	79

INGOT PRODUCTION‡

	Week Ended Nov. 18	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.9†	153.3	155.3	149.0
NET TONS (In thousands)	2,472†	2,463	2,495	2,394

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 93 Technical Outlook—p. 141

Another first to help widen the scope of welding

Opens up new standards of speed and economy in welding mild steel

Here's the first all-position class 6010 electrode ever made with an iron powder coating. X-Ray and physical properties of the new Easyarc 10 are excellent. Outstanding characteristics for all-position welding with the inherent advantages of an iron powder coating. For a free sample of the new Easyarc 10, contact your nearest Airco Office.

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Air Reduction Canada Limited

Trend in tin plate is from cut sheets to coils as . . .

Canners Seek To Cut Costs

CANMAKERS are going ahead with plans to fight rising tin and steel prices by purchasing tin plate in coils rather than sheets. While steelmakers doubt that the move will cut over-all purchases, tin plate producers will be affected by these developments:

American Can Co., New York, has appropriated $27 million for the installation of new manufacturing facilities "as a first step in combating rising tin and steel plate prices." In late October, the firm started construction on a Hammond, Ind., plant which will make tin and steel plate from coil stock. This will eliminate purchase of precut sheets.

Continental Can Co. Inc., New York, also expects to buy more tin plate in coils, company representatives told newsmen at the firm's new research laboratory in Chicago last summer.

Motive—Tin plate manufacturers see the coil-buying trend as part of industry's general desire to cut costs. William C. Stolk, president, American Can, has put it this way: "We will take plate from the steel companies in huge coils before it has been inspected, cut into sheets, or, in the case of black plate, before it has been chemically treated." Several extra charges will be eliminated.

Canmakers believe they will save money in the long run. They complain that the price of the most commonly used variety of electrolytic tin plate has increased 91 per cent since 1946. Canco plans to process between 75 and 85 per cent of the steel and tin plate it uses.

For many years, steelmakers have shipped black plate in coils to such users as button manufacturers. To meet canmaker's needs, electrolytic tin plate coils will have to be much larger than the black plate. One steelmaker reports they will weigh as much as 15,000 lb. Under present plans, producers will give canmakers a deduction for tin plate shipped in this form.

Coming Soon—Now in the "talking stage," the trend to coils will gain momentum after canmakers complete processing facilities in 1957 and 1958. Steelmakers may begin to ship coils of electrolytic tin plate to canmakers late in the second quarter of next year.

Production lines of several tin plate producers are already equipped with coilers for electrolytic. Weirton Steel Co., Weirton, W. Va., is one. Jones & Laughlin Steel Corp., Pittsburgh, is another. J&L will simply eliminate the final shearing operation. "There will be adjustments in packaging," company sales officials add. "Instead of shipping in cartons, we will wrap coils." No change in transportation facilities is required.

Preparations — Several other firms will install equipment to meet the changes in demand. Inland Steel Co., Chicago, will put in a coiler, but will not ship electrolytic tin plate in coils in the immediate future. U.S. Steel Corp. and Wheeling Steel Corp. are renovating their mills to allow the shipment of coils or cut lengths. Due to installation delays, all steelmakers won't be able to ship the bulk of their tin plate in coils before 1958.

At least one steelmaker is frankly skeptical of the trend. The producer told STEEL: "We have not equipped to sell tin plate in coils. The trend is still in the formative stage. Canmakers will have to do their own inspecting and cutting, which is expensive. If steelmakers don't inspect the plating before shipment, they won't stand behind its quality. Can producers will be taking a calculated risk in buying coils. Smaller can companies will still be using sheets, and we will continue to supply them."

What's Ahead—Most producers aren't too concerned about the kind of steel canmakers plan to buy. The prime question is: Will they continue to increase their long term use of tin plate? All market studies are in the affirmative.

Tin plate salesmen point out that packers ship a constantly growing number of items in cans, and the use of containers for such products as beer, motor oil, coffee and shortening is growing. A J&L market survey made early this year showed over-all demand for tin mill products will approach the 7.5 million-ton-mark by 1960, an increase of more than 30 per cent over 1954 shipments. The survey estimates that tonnage needs of food canmakers will be 17.5 per cent higher in 1960 than in 1954.

Wire . . .

Wire Prices, Pages 221 & 222

A strike of engineers closed the Donora, Pa., plant of American Steel & Wire Division, U.S. Steel Corp., Nov. 11. The walkout forced the company to bank two blast furnaces and to shut down its 13 open hearths. The division lost 2500 tons of steel production daily during the work stoppage.

Demand for wire products continues spotty. Producers still have open space in their December schedules. Expectations are that consumers of both merchant and manufacturers wire will coast

along largely on inventories until on toward the end of the year. Wire rods are reported in tight supply at some points, notably in the East.

Steel Bars . . .

Bar Prices, Page 219

Hot-rolled carbon bar business is expanding, especially in the large rounds, 4 in. and over, for converters and forgers. Large flats are in better than average demand.

Except for large rounds, most sizes of cold-drawn bars are readily available. Where processors have hot stock, they can make deliveries this year, and most now have fairly well rounded inventories of hot stock on hand.

While over-all demand for hot carbon bars is improving in the East, compared with two to three weeks ago, the situation in general still is mixed.

Some buyers hadn't specified fully against January allotments, when lead time elapsed a few days ago. But sellers were able to divert the extra tonnage elsewhere, and they look for good business throughout the first quarter.

International Harvester Co. is rehiring workers laid off in early October to let demand absorb its overstock of tractors and farm equipment. About 1500 men are being recalled at Rock Island, Canton, East Moline and Rock Falls, Ill., plants.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 219

Heavy volume business in reinforcing bars and other forms of reinforcing steel are expected throughout the winter. Ordinarily a seasonal lag in construction activities is reflected in steel buying. With building needs exceeding supply, buying this year is expected to hold up.

Two government projects involve more than 10,000 tons of reinforcing, a defense type structure at McChord Air Field, Washington, and a reclamation dam and tunnel near Redding, Calif.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 220 & 221

The world political situation hasn't noticeably affected the steel markets, but expectations are that government requirements for such items as oil drums and steel for reactivated tankers and other vessels will spurt if swift progress toward a peaceful solution of the current difficulties isn't achieved.

The international situation has not influenced any noticeable quickening of consumer buying for inventory. Products that most likely would be first to reflect inventory building would be cold-rolled and galvanized sheets.

Hot-rolled sheet supply appears tightest since last spring. Some makers have virtually blanked out January production due to anticipated arrearages, and they are being faced with more first quarter tonnage than they can handle, or at least are willing to accept in view of the continued uncertainty over the extent of automotive demand for the hot and cold-rolled grades.

Cold-rolled specifications are increasing, although supply is still on the easy side, notwithstanding

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that producers generally will have at least two or three weeks carry-over at the year's end. The item that is in most easy supply appears to be galvanized sheets.

Eastern district sellers say demand for hot rolled does not seem quite so pressing as it was a few weeks ago, despite the threatening international situation. Cold-rolled sheet demand in the area continues disappointing and galvanized sheets are available for the asking. Considerable excess cold-rolled tonnage is being offered in New England; also galvanized.

Pittsburgh district mills continue to operate at capacity, but slowness in automotive and appliance ordering of cold-finished sheet may extend into January, unless production in those industries is particularly heavy and large inventories of sheet are consumed.

At Cleveland, much the same situation prevails as at other market centers—hot rolled is in strong demand but pressure for cold rolled is somewhat disappointing. Area mills have booked substantial auto tonnage in recent weeks and expect volume to grow steadily. Mills at Chicago and Cleveland are not discounting the possibility that a shortage of cold rolled can develop in January if auto sales are strong over the next few weeks.

Plates . . .

Plate Prices, Page 219

While no further increase in the volume of government-rated work is reported in the plate market, there is pressure for deliveries, especially from the Navy for ship tonnage. Some vessels are being taken out of "moth balls" and overhauled for resumption of service.

The plate mills are co-operating fully, but production schedules are so tight it is difficult for them to alter delivery promises over the next few weeks. To date, no special government directives have been issued, but the gravity of the international political situation has alerted the mills to anticipate quick action in event of further deterioration in the world situation.

Most of the platemakers are going along on the assumption that first quarter set-asides for rated requirements of carbon plate will be around 10 per cent, as the government specified early in October. Current quarter set-asides amount to approximately 8 per cent.

Some producers are accepting first quarter carbon tonnage on a month-to-month basis, but all makers of low alloy plates are taking orders for the entire period and appear to be fully scheduled. One seller of low alloy plates has opened books for April tonnage.

In opening books on carbon plates for January, most of the mills had little new tonnage to offer, apart from that which they were obligated to accept under ratings. The reason was the anticipated year-end carry-over. In fact, there will be a couple of mills that will have carry-overs extending into February.

Chicago area mills report that products which have been tight—plates, shapes, large bars and tin plate—are getting tighter. One district mill has fully booked its

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capacity for conversion plates and shapes through the first quarter. At one time some interest was displayed in hot-rolled sheet conversion, but that eventually fell by the wayside.

Heavy inquiry from a diversity of sources continues—car builders, electrical equipment manufacturers, fabricators of pressure vessels, tanks and marine boilers are pressing for tonnage. Also, there is a pickup in oil refinery and chemical equipment specifications.

Tubular Goods . . .

Tubular Goods Prices, Page 223

Most small consumers of pipe in the Pittsburgh area are trimming inventories in anticipation of year-end taxes. Mill backlogs in mechanical and pressure tubing are short. Owing to prospects for continued high level construction next year and strong auto requirements, mills anticipate heavy demand for most of 1957.

Oil country goods makers say near-record production in October helped them to cut unfilled orders, although the carry-over into November represented a month's production. It is expected that there will be heavy pressure on oil drillers to increase drilling in both North and South America next year. The outlook is for continued strong demand for oil country goods.

Warehouse . . .

Warehouse Prices, Page 224

Warehouses are attempting to get more cold-rolled sheets from the mills than their quotas provide. This is attributed chiefly to more active demand from consumers in the automotive industry.

Mills have been able to build up distributors' inventories of most products due to their big output in October, followed by capacity operations this month. Stocks of plates, structurals and nickel-bearing sheets remain well below consumers' demands.

Hot-rolled bars, which were hard to obtain in large sizes, now can be stocked without difficulty. Distributors can receive additional tonnages of most tubular products and bars for delivery in December and January.

With steel shipments becoming more current, warehouses can offer good service to fabricators, other than construction firms.

Bookings are up as much as 10 per cent this month over October in most districts.

Iron Ore . . .

Iron Ore Prices, Page 225

Lake iron ore shipments totaled 2,577,335 gross tons in the week ended Nov. 12, reports the Lake Superior Iron Ore Association. This compares with 2,341,517 tons moved in the like week a year ago.

Shipments to Nov. 12 amount to 71,498,177 tons, against 83,552,208 tons to the same date last year. The lag this year is due to the steel and shipping strikes.

Structural Shapes . . .

Structural Shape Prices, Page 219

While structural steel orders are spotty, some heavy work is in prospect. A 30,000-ton office building for Rockefeller Center, New

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York, has been revived. Another 30,000-ton office building is being figured for 33 West 51st St., New York. Considerable bridge work also is being figured in the area, along with a diversity of other types of construction.

Extended delivery promises on 1700 tons of steel for an office structure at 630 Third Ave., New York, have resulted in plans for redesign of the building for reinforced concrete construction.

Heavy structural backlogs in New England include substantial tonnage of low alloy steel; a 2740-ton bridge, New York thruway-Connecticut turnpike connection, Greenwich, Conn., takes 1675 tons of low alloy steel. Less tonnage is being estimated in New England, and some building is being redesigned for reinforced concrete. Included is an office building, the first to be erected in downtown Boston in several years. More tonnage is being placed direct by owners, and contractors are getting feeble response to inquiries for estimates.

Two of the largest Pennsylvania state highway projects to come out in some time involve 12,310 tons. They are for Allegheny county, bids Dec. 7. Awards in eastern Pennsylvania are light and scattered, extended delivery promises on fabricated steel being a contributing factor.

Award is expected shortly on 700 tons of shapes required for a facility at Spokane, Wash. Also, 500 tons are pending for a YWCA building at Portland, Oreg.

Effective Nov. 9, Jones & Laughlin Steel Corp. increased size and section extras on its junior beams 25 cents per 100 pounds. The new extras are: 6-inch, $1.60 per 100 lb; 7-inch, $1.65; 8-inch, $1.20; 10-inch, $1; 12-inch, $1.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6500 tons, bridge, Corpus Christi ship channel, Nueces county, Texas, to American Bridge Division, U.S. Steel Corp., Pittsburgh.

1500 tons, physical education building, Air Force Academy, Colorado Springs, Colo., to Kansas City Structural Steel Co., Kansas City, Kans., bids direct, $687,645.

210 tons, two rolled beam bridges, Vernon, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Della Bitta-Bassola Inc., Plantsville, Conn., general contractor.

100 tons, hangar, National Air Lines, International Airport, Miami, Fla., to Sheffield Steel Co., Miami; Fred Howland Inc., Miami, general contractor.

100 tons, Waldo County Hospital, Belfast, Me., to Lyons Iron Works, Manchester, N. H.; F. W. Cunningham & Sons, Portland, Me., general contractor; reinforcing bars, Bancroft & Martin Rolling Mills Co., South Portland, Me.

STRUCTURAL STEEL PENDING

30,000 tons, office building, 33 West 51st St., New York; Turner Construction Co. is engineer.

30,000 tons, office building No. 15 (Time-Life), Rockefeller Center, New York, project revived; George A. Fuller and John Lowery are joint contractors.

7150 tons, north and south approaches, Ft. Pitt State bridge, Pittsburgh, bids Dec. 7.

5163 tons, state highway viaducts, Pittsburgh, bids Dec. 7.

4000 tons, high level bridge, south channel, St. Lawrence seaway; originally scheduled for bidding Nov. 15, postponed.

3625 tons, Colorado river bridge, bids to the Bureau of Reclamation, Kanab, Utah.

2740 ton, including 1675 tons low alloy, interstate bridge, Byram river, Greenwich, Conn.-Port Chester, N. Y., 16 span structure, plate girder span with rolled beam approaches, linking the Connecticut turnpike and New England section, New York state thruway.

2800 tons, Clear Creek tunnel, northern California, bids to the Bureau of Reclamation, Weaverville, Calif., Dec. 20.

975 tons, tainter gates, anchorages and sills, Hartwell project, Savannah river; bids to the Corps of Engineers, Savannah, Ga.

548 tons, state bridgework, Berks county, Pa., bids Dec. 7.

380 tons, 4-span WF beam bridge, Vernon-Guilford, Vt., also 100 tons, reinforcing bars.

300 tons, Staten Island ferry slips, Battery Place, New York.

250 tons, steel for 20 transmission towers, also anchor bolts, leg extensions, etc.; bids to the Bonneville Power Administration, Portland, Oreg., Nov. 13.

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215 tons, factory building, Johns-Manville Co., Richmond, Ind.

160 tons, 3-span WF beam bridge, Black river, North Springfield, Vt.; also 55 tons, reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

5000 tons, cadet quarters, Air Force Academy, Colorado Springs, Colo., to Cobusco Steel Products Co., Denver; Robert E. McKee Inc., Santa Fe, N. Mex., general contractor.

1300 tons, hangar, National Air Lines, International Airport, Miami, Fla., to Joseph H. Fox & Co., Birmingham; Fred Howland Inc., Miami, general contractor.

255 tons, two dormitories, University of Rhode Island, Kingston, R. I., to Plantations Steel Co., Providence, R. I.; O. Ahlborg & Sons Inc., Cranston, R. I., general contractor; fabricated structural steel, Providence Steel & Iron Co.

150 tons, bars and structurals, high school addition, Lynnfield, Mass., to Northern Steel Inc., Medford, Mass. (bars), and Security Steel & Wire Co., Boston, (structurals); E. H. Porter Construction Co., Peabody, Mass., general contractor.

REINFORCING BARS PENDING

9000 tons, Trinity dam project, northern California; bids to the Bureau of Reclamation, Weaverville, Calif., Dec. 20.

1900 tons, SAGA operations center, McChord Air Base, Washington; joint contract by Western Electric Co., prime contractor, to Howard S. Wright & Co. Inc., and Lease Co., Seattle.

175 tons, single span Colorado river bridge; bids to the Bureau of Reclamation, Kanab, Utah.

150 tons, Howard Prairie canal, Rouge river project, Oregon; also ½-mile of 48-in. precast concrete pipe siphon; bids to the Bureau of Reclamation, Medford, Oreg., Dec. 13.

PLATES . . .

PLATES PENDING

455 tons, plate steel liners, Clear Creek tunnel; bids to the Bureau of Reclamation, Weaverville, Calif., Dec. 20.

130 tons, 200,000-gal elevated water storage tank, Grand Forks, N. Dak.; bids about Dec. 6, Corps of Engineers, Omaha, Nebr.

300 tons, tanks, Esso Standard Oil Co., New York; pending.

PIPE . . .

CAST IRON PIPE PENDING

705 tons, 12 and 16 in.; bids in to Alderwood Manor, Wash.

108 tons, system expansion, Silver Lake, Wash.; bids in.

STEEL PIPE PENDING

1250 tons, 24-in. pipe, Long Island Lighting Co., Hicksville, L.I.; bids asked.

400 tons, large pipe, Grinnell Corp., Warren, O.; bids asked.

RAILS, CARS . . .

RAILROAD CARS PLACED

Missouri Pacific, 2000 freight cars, plus an additional 2000 for a subsidiary, the Missouri-Illinois, to the Missouri Pacific's shops at De Soto, Mo.

Steel Output Sets Record

Monthly steel production reached the 11-million-ton mark for the first time in history during October, reports the American Iron & Steel Institute. Output for the month is estimated at 11,032,000 net tons (subject to revision). This compares with 10,422,659 tons in September and 10,501,050 tons in October a year ago.

Total output for the first ten months this year is placed at 93,806,591 net tons, against 96,285,168 in the like period last year.

During October, the nation's steelmaking furnaces operated at an average of 101.2 per cent, based on rated capacity of 128,363,090 net tons as of Jan. 1, 1956. This compares with 98.8 per cent in September. The average for the first ten months was 87.5.

Steel Ingot Production—October, 1956

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1956								
January	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr.	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr.	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo.	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	...	...	292,012	30.5	1,622,163	14.9
August	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
*September	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
*3rd Qtr.	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
*9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
†October	9,824,000	103.0	330,000	81.2	878,000	91.8	11,032,000	101.2
1955								
January	8,054,345	86.0	199,229	49.0	584,162	63.6	8,837,736	82.7
February	7,734,884	91.5	197,091	53.7	564,959	68.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.8	666,235	72.6	9,981,754	93.4
1st Qtr.	24,849,255	91.4	651,813	55.2	1,815,356	68.1	27,316,424	88.0
April	8,858,549	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	305,347	75.1	715,678	77.9	10,328,316	96.6
June	8,764,430	96.6	283,544	72.0	698,493	78.6	9,746,467	94.1
2nd Qtr.	26,930,270	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mo.	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,232,535	88.1	268,348	66.1	600,063	65.5	9,100,946	85.3
August	8,600,612	91.8	298,972	73.5	694,961	75.7	9,594,545	89.7
September	8,829,266	97.6	307,171	78.2	745,888	84.1	9,882,325	95.7
3rd Qtr.	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mo.	77,441,938	93.9	2,390,264	66.8	5,951,916	73.6	85,784,118	91.1
October	9,369,704	100.0	330,150	81.2	801,196	87.3	10,501,050	98.2
November	9,141,244	100.8	306,674	77.9	799,480	89.9	10,247,398	99.0
December	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	98.5
4th Qtr.	27,917,479	100.5	929,253	77.0	2,405,235	88.3	31,251,967	98.6
Last Half	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	95.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

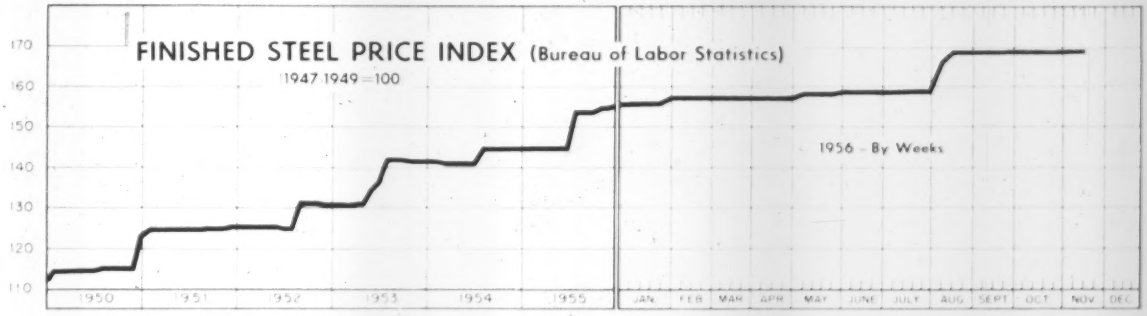
*Revised. †Preliminary figures subject to revision.

Steel Product Shipments—September, 1956

(All grades; net tons)

Products	Carbon	Alloy	Stainless	1956 First 9 Mo.	1955 First 9 Mo.
Ingots, etc.	52,727	19,180	5,615	537,902	444,116
Blooms, etc.	127,872	44,453	2,664	1,660,999	2,076,483
Tube rounds	223	75	...	10,900	NA
Skelp	17,809	...	...	131,133	131,789
Wire rods	95,003	957	637	791,470	865,922
Structurals (heavy)	493,216	4,682	22	3,759,756	3,431,869
Steel piling	45,051	...	...	291,486	279,849
Plates	705,947	38,183	3,260	5,536,938	4,838,887
Rails (standard)	119,288	...	...	843,978	918,578
Rails (all other)	8,284	...	...	75,076	56,505
Joint bars	7,688	3	...	64,199	53,621
Tie plates	24,847	...	...	228,495	240,815
Track spikes	5,715	...	...	76,319	72,674
Wheels	29,795	78	...	255,647	220,981
Axles	15,251	23	...	123,406	83,052
Bars, hot rolled	588,030	162,630	5,347	6,384,238	6,392,086
Bars, reinforcing	233,851	...	...	1,778,472	1,574,315
Bars, cold drawn	99,207	21,127	1,367	1,316,321	1,366,402
Tool steel	1,291	8,135	...	96,515	83,042
Standard pipe	268,537	50	...	2,137,661	2,194,642
Oil country goods	181,659	32,954	...	1,845,712	1,856,914
Line pipe	240,593	...	...	2,391,014	2,280,896
Mech. tubing	53,404	17,807	375	717,133	697,511
Pressure tubing	27,791	5,716	1,739	271,272	197,492
Wire—drawn	252,172	4,046	2,665	2,253,273	2,348,604
Nails & staples	54,803	...	...	440,631	523,234
Barbed wire	4,566	...	...	65,061	101,974
Woven fence	21,357	...	...	230,195	269,100
Bale ties	2,844	...	...	44,661	53,662
Black plate	70,143	...	...	582,043	616,512
Tin plate—HD	72,400	...	...	718,781	915,775
Tin plate—electro	396,588	...	...	3,585,313	3,750,257
Sheets—HR	680,720	22,597	1,258	6,318,730	6,922,604
Sheets—CR	1,027,727	4,001	13,950	9,790,123	10,981,152
Sheets—galvanized	256,803	...	...	2,185,056	2,087,155
Sheets—other coated	16,820	...	...	176,572	199,670
Sheets—enameling	Not available. Included in cold rolled Sheets				162,085
Electrical sheets & strip	11,509	57,889	...	604,305	584,513
Strip—hot rolled	141,570	2,316	1,183	1,315,955	1,546,656
Strip—cold rolled	97,101	1,601	16,241	1,188,245	1,251,209
Total shipments	6,550,202	448,503	59,323	60,824,986	62,672,603

Price Indexes and Composites



Nov. 13, 1956	Week Ago	Month Ago	Oct. Avg.	Year Ago
168.8	168.8	168.6	168.6	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 13

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb	9.433
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.233
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.368
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.595

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 14 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.58	208.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.659	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.66	$137.66	$137.48	$128.14	$100.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	61.50	59.17	56.67	45.67	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 14 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.89	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.85	$9.85	$9.85	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{1}{2}$-$\frac{5}{8}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Nov. 14 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld., Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	235.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$62.50	$58.50	$55.50	$45.50	$44.00
No. 1 Heavy Melt, E. Pa.	59.00	58.00	56.50	47.00	42.50
No. 1 Heavy Melt, Chicago	63.00	61.00	58.00	44.50	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	63.50	48.00	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	61.50	45.50	43.00
No. 1 Heavy Melt, Buffalo	59.50	57.50	57.50	43.50	43.00
Rails, Rerolling, Chicago	87.50	87.50	84.00	66.50	52.50
No. 1 Cast, Chicago	50.50	50.50	50.50	47.50	49.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

JOHN D. LOCKTON

Portrait by Fabian Bachrach

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STEEL
The Metalworking Weekly

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers page 220; to footnotes, page 222.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)
Detroit R7 .....$74.00
Houston 85 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 .....74.00
Bridgeport,Conn. N19..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2..74.00
LoneStar,Tex. L6 .....80.00
Munhall,Pa. U5 .....74.00
Pittsburgh J5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 .....91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 ....91.50
Houston 85 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Pittsburgh J5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston 85 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14 111.50
S.Duquesne,Pa. U5 ..111.50

SKELP
Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS
AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston 85 .....6.05
IndianaHarbor,Ind. Y1 .5.80
Johnstown,Pa. B2 ....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. 85 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ...6.05
Monessen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.30
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston 85 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 ....5.05
KansasCity,Mo. 85 ....5.10
Lackawanna,N.Y. B2 ....5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14 .5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange
Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 ....5.85
IndianaHarbor,Ind. I-2..5.00
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 ....8.05
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston 85 .....7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ....7.40
KansasCity,Mo. 85 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.40
Ind.Harbor,Ind. I-2 ...7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ...5.90
Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky. (15) A10..4.85
Bessemer,Ala. T2 .....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 ....5.35
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 .5.55
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 ....5.80
Houston 85 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. N9 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 .4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ...4.85
Warren,O. R2 .....4.85
Weirton,W.Va. W6 .....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....6.70
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.128

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 ....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 ....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 .7.95
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston 85 .....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14 .7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 ....6.85
Fontana,Calif.(30) K1 ..7.55
Gary,Ind. U5 .....6.85
Houston 85 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. N9 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14 .6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES
Cleveland J5 .....6.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ...5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron
Ashland c.l. (15) A10 .5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.375
Bridgeport,Conn. N19 .5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ...5.175
Emeryville,Calif. J7 ...5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ...5.157
Houston(9) 85 .....5.325
Ind.Harbor(9) I-2, Y1 .5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) 85 .5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa.(23) M18 ...5.425
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.Tonawanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'e'go(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 .5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11 .5.775
Weirton,W.Va.(9)W6 ..5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy
(Including leaded extra)
Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston 85 .....6.375
Ind.Harbor,Ind. I-2,Y1 6.125
Johnstown,Pa. B2 ....6.125
KansasCity,Mo. 85 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.425
Bessemer,Ala. T2 ....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston 85 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. 85 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14 7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.225
Houston 85 .....5.325
KansasCity,Mo. 5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill(1) N15 ..5.075

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.10
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco 87 .....5.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.45
KansasCity,Mo. 85 ....6.45
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy
(Including leaded extra)
Ambridge,Pa. W18 .....9.475
BeaverFalls,Pa. M12 .....9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.00
Monaca,Pa. S17 .....9.225
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12,R2 6.85
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPrk,Ill. N5 .....6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. B7 .....6.85
Hammond,Ind. L2, M13 6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 .....8.30
LosAngeles P2, R2 .....8.30
Mansfield,Mass. B5 .....7.40
Massillon,O. R2, R8 .....6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 .....6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 .....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 .....6.85

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md.(5) C19 6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 .....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 .....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ....8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. B7 .....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 .....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 .....8.325
LosAngeles P2, S30 .....10.10
Mansfield,Mass. B5 .....8.625
Massillon,O. R2, R8 .....8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 .....8.625
Youngstown F3, Y1 .....8.325

BARS, Reinforcing
(To Fabricators)
Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. B5 ....5.325
Lackawanna,N.Y. B2 .5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 .5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 .5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance, Calif. C11 .5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ⅛-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 ....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O. (3) P11 ....5.15
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19 .5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
McK.Rks.(S.R.) L5 ..13.15
McK.Rks.(D.R.) L5 ..18.00
McK.Rks.(Staybolt)L5 .19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 ....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.725
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 ....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago, Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Dravosburg,Pa. U5 ....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....5.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ..6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2..5.75
Steubenville, O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg,Pa. U5 ....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30†
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30†
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ...6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E. Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest SteelRoll Mill
N15 Northwestern S.& W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div. EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div. U.S. Steel Corp.
T3 Tenn. Prod. & Chem
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc

W1 Wallace Barnes Co.
W2 Wallingford Steel Co
W3 Washburn Wire Co
W4 Washington Steel Corp
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.875
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackawanna,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.50
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill. C11, N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.55
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	...
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	...
Dearborn,Mich. D3	8.05	9.90	12.70	...	...
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	...
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	...
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	...
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	...
Buffalo W12	16.80	...	...
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
New York W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	...	...
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	...	...
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.95*

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35,	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	...
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	...
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	...	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	...
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	...
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525‡	12.575‡	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	...	...	...
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	...	...	18.50	19.00	19.50	...
Vandergrift,Pa. U5	..	15.90	16.90	18.50	19.00	19.50 14.55**
Warren,O. R2	...	...	...	...	...	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.975	...	...
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind.Harbor,Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50

TERNE PLATE	
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	$7.15
Gary,Ind. U5	7.25
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester,A7, J4, T6	9.025

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.85
Bartonville,Ill. K4	14.27
Buffalo W12	14.15
Chicago W13	13.85
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.60
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS, Stock — **Col.**

AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville,Ill. (7) K4	169
Chicago (7) W13	167
Cleveland (7) A9	173
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex 85	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. 85	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill.(1) N15	164
Worcester,Mass. A7	170

(To Wholesalers; per cwt)
Galveston,Tex. D7 — $8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock — **Col.**

AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville,Ill. (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex 85	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. 85	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill.(1) N15	164
Worcester,Mass. A7	170

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston 85	9.78
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. 85	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston 85	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. 85	10.10
Kokomo,Ind. C16	10.45
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	*10.65*
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim.

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston 85	10.15
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. 85	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	184§
Atlanta A11	190*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. 85	189**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. 85	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	191*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	207**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(1) N15	188*

WOVEN FENCE, 9-15 Gg. — **Col.**

Ala.City,Ala. R2	176**
Allq'ppa,Pa. 9-14½ga.J5	184§
Atlanta A11	182*
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. 85	181**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. 85	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	180*

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	.16.10	18.05
Buffalo W12	.16.10	
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Houston 85	15.95	17.50**
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kan.City,Mo.85	15.95	17.50**
Kokomo C16	15.80	17.35†
Minnequa C10	16.45	18.15**
P'lm'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	

WIRE, Merchant Quality

	(6 to 8 gage) An'ld	**Galv.**
Ala.City,Ala. R2	7.95	8.35**
Allquippa J5	8.10	8.625§
Atlanta A11	8.05	8.65*
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) 85	8.20	8.60**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) 85	8.20	8.60**
Kokomo C16	8.05	8.45†
LosAngeles B3	8.90	9.50*
Minnequa, C10	8.20	8.60**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	8.10	
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	8.90	9.30**
Spar'wsPt. B2(48)	8.05	8.65*
Sterling(1)(48)N15	7.95	8.55*
Struth'rs,O.(48) Y1	7.95	8.45‡
Worcester,Mass. A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston 85	195
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
KansasCity,Mo. 85	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
SparrowsPoint,Md. B2	192
Sterling,Ill. N15	190
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Based discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	55
Longer than 6 in.	46.5
⅝ in. thru 1 in.:	
6 in. and shorter	46.5
Longer than 6 in.	44
1⅛ in. and larger:	
All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	55

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	35
Longer than 6 in.	23
⅝ in. thru 1 in.:	
6 in. and shorter	20
Longer than 6 in.	20
1⅛ in. and larger:	
All lengths	20

Lag Bolts
All diameters:

6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47
Blank Bolts	54

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:	
All sizes	59
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	45
Hex Nuts, Reg. & Heavy, Hot Pressed:	
⅝ in. and smaller	63
⅞ in. to 1 in. incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger	58
Hex Nuts, Reg. & Heavy, Cold Punched:	
⅝ in. and smaller	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58
Hex Nuts, All Types, Hot Galvanized:	
⅝ in. and smaller	50
⅞ in. to 1 in. incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger	58

CAP AND SET SCREWS
(Based discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread Bright:

6 in. and shorter:	
⅝ in. and smaller	47
¾, ⅞ and 1 in. diam.	31
Longer than 6 in.:	
⅝ in. and smaller	18.5
¾, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	34
¾, ⅞ and 1 in. diam.	13
Longer than 6 in.:	
⅝ in. and smaller	+1
¾, ⅞ and 1 in. diam.	+19
Fillister Head, Coarse Thread: Listed Sizes	+31
Flat Head, Coarse Head: ¼ in. and smaller by 6 in. and shorter	+57
Set Screws, Square Head, Cup Point, Coarse Thread: Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
7/8-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2¾	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

RAILS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	...(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield, Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity, Mo. 85	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles,flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 8 in., inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb. and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.30c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 8.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.50	46.75	48.25	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	58.50	57.50	60.50	64.25	73.50	73.50
310	42.25	53.75	69.00	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	63.75	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302					33.25
304		34.50		41.50	35.25
304-L		37.20		44.65	
316		38.70		46.65	52.25
316-L		45.70		54.35	
316-CB		45.90		54.75	
321		36.35		43.40	42.00
347		39.50		48.45	51.00
405		29.20		37.05	
410		28.70		36.55	
430		28.70		36.55	
Inconel	45.70	54.80	63.85	73.00	
Nickel	37.95	46.25	54.60	62.95	
Nickel, Low Carbon	38.25	46.90	55.60	64.40	
Monel	40.30	49.10	57.95	66.80	
Copper*					46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.250	¢ Cr Hot Work	0.45-0.495
Extra Carbon	0.345	5% Cr Hot Work	0.943-0.475
Special Carbon	0.41-0.45	V Cr Hot Work	0.460
Oil Hardening	0.450	Hi Carbon Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20-25	4-25	1-6	12-25		4.170
18-25	4-25	1	4-75		2.385
18	4	2	9		2.7575
18	4	2			1.845
18	4	1			1.680
9	3.5				1.275
13.5	4	3			1.945
13.75	3.75	2	5		2.325
6.4	4.5	1.9		5	1.185
6	4	3		6	1.430
1.5	4	1		8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.79	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.89	65.39	65.39	65.89
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; Intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.07§	9.27§	9.83§	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09¹	15.69	8.57	8.12	10.81
Birmingham	7.68§	8.88§	8.85§	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90§	9.10§	9.10§	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60¹⁰	....	7.90	8.00	8.65	8.70¹⁰	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.54	9.09	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.00§	9.20§	9.22§	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	8.29	9.49	10.31	....	8.39	8.52	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ¹—400 to 999 lb; ²—1000 to 1999 lb; ³—2000 to 3999 lb; ¹⁰—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morriaville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	32.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$29.00-30.00
Domestic, scheelite, mine	55.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$52.00-53.00
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00
South African Transvaal	
48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00
Turkish	
48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	*$14.50-15.50*
Connellsville, foundry	*17.50-18.50*

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	24.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	55.10-58.40†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	*$1.05*
Stainless Steel, 316	*$1.40*
Tin	14.50*
Zinc 5000-lb lots	19.75-13.00†

Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.40	$7.40	$7.40	$7.65
Bar Size Angles	7.11	7.11	7.11	7.24
Structural Angles	7.50	7.50	7.50	7.80
I-Beams	7.75	7.75	7.75	8.15
Plates	9.50	9.50	9.50	10.00
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.32	27.32	27.32	31.15
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails	7.90	7.90	7.90	8.02

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

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E. 125-acre tract available here.
F. 190-acre tract available here.
G. 1000-acre tract available here.
H. 600-acre tract available here.
I. 1000-acre tract available here.

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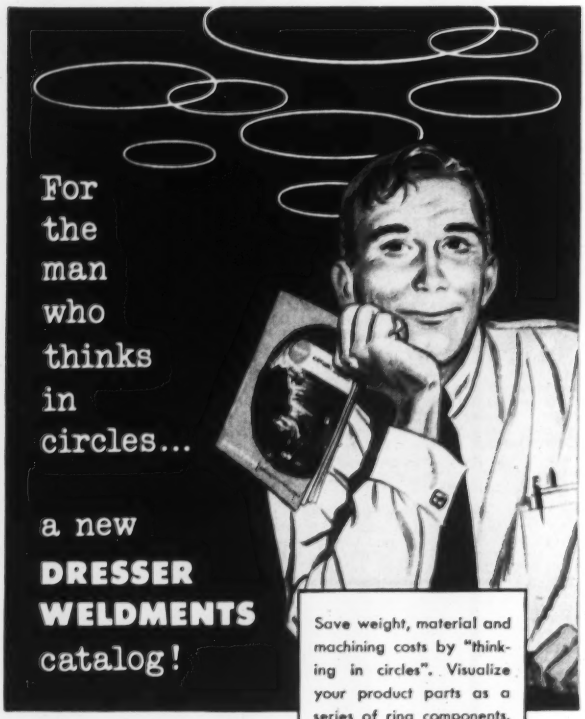
PHONE COLLECT Jefferson City 6-7185 for complete, confidential information or write Dept. K6104
Richard Kinne, Industrial Director
Missouri Division of Resources and Development
Jefferson City, Missouri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Pig Iron . . .

Pig Iron Prices, Page 224

Most foundries are maintaining operations on a five day week basis. They are getting slightly heavier orders from the automotive industry. They also report a little pickup in demand from the farm implement industry.

The Suez crisis is causing a flurry of increased inquiry in some districts with foundries showing some concern about their long range supply prospects.

In some districts actual purchases of iron have declined a bit as many foundries are a little less concerned about their inventories. This factor is affected strongly by the approach of the holidays and the year-end inventory taking period when the usual practice is to keep inventories at a minimum.

The Birdsboro, Pa., furnace of the Colorado Fuel & Iron Corp. has suspended operations temporarily for repairs.

On the credit side of the eastern pig iron supply situation are reports that the smaller stack at Swedeland, Pa., originally scheduled to suspend production Jan. 1 for rehabilitation and enlargement, may continue in operation for a month or two beyond year's end.

Metallurgical Coke . . .

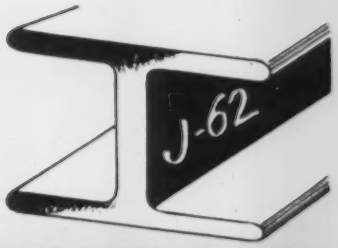
Metallurgical Coke Prices, Page 225

Youngstown Sheet & Tube Co. will build a third 76-oven coke battery at its Campbell Works in Youngstown as part of its $250-million expansion program. Allied Chemical & Dye's Wilputte Coke Oven Division will build the unit which will be identical with two others at the works.

The new battery will charge more than 1800 tons of coal daily to produce about 1250 tons of coke. Two older batteries are being razed to make room for the new unit.

Steady demand and increasing prices on coal have resulted in higher prices on beehive oven coke at Connellsville, Pa. The price of furnace coke averages around $15 a ton.

Demand is firm for oven foundry coke, but there is no danger of a shortage this winter. The price at Neville Island, Pa., remains unchanged at $28.25.



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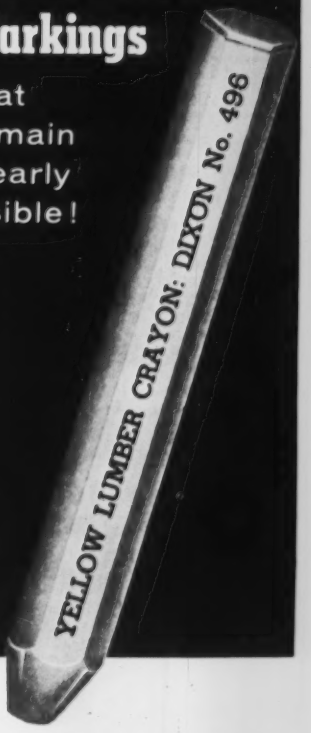

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Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 37.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 24.15c per lb of contained Mn, packed, carload 25.45c, ton lot 27.05c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, 37.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 27.75c per lb of contained Cr; c.l packed 29.3c, ton lot 31.05c; less ton 32.45c Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31, less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb. No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed c.l. 16c, ton lot 17.45c, less ton 19.1c. F.o.b Alloy, W. Va., Ashtabula, Marietta, O. Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

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STEELMAKING SCRAP PRICE COMPOSITE
Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL
1956
1955
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
Nov. 14 1956 $61.50
Week Ago $59.17
Month Ago $56.67
Year Ago $45.67
Oct. Avg. $57.27

Scrap Index Hits Record High

STEEL's composite on steelmaking grades tops $61 on increases at Pittsburgh, eastern Pennsylvania and Chicago. Spirited buying is lacking, but market undertone is strong

Scrap Prices, Page 230

Pittsburgh—Well over $60 a ton is being paid for material to cover the latest purchase of No. 1 heavy melting scrap by a major Pittsburgh firm. The mill paid $58 a ton. Pressure from fringe areas, including Butler, Pa., and Youngstown, is sufficient to force the price of No. 1 to $63 a ton, despite a lack of large mill orders.

Chicago — Broker buying and offerings continue to set steel scrap prices here while the mills hold aloof. The market is at least $2 to $3 a ton higher than it was a week ago, and $4 to $7 in some instances above the prices paid on the last mill acquisitions nearly a month ago.

Good inventories permit the steelmakers to defer buying, but strengthening the hand of collectors and dealers is the nearness of winter when yard operations normally are hampered by bad weather.

Of 43 blast furnaces in the district, 42 were in operation at last midweek, and a full house is in prospect within the next few days.

Philadelphia — Delivered prices on No. 1 heavy melting, No. 1 bundles and No. 1 busheling have advanced $1 to $59, and No. 2 heavy melting similarly to $49 on the basis of scattered sales. The undertone of the market continues strong, with only No. 2 bundles of the major open-hearth grades unchanged.

Prices on several of the lesser steel scrap items have advanced. Low phos structurals and plates are $66-$67, delivered. Electric furnace bundles are higher at $61-$62, delivered, machine shop turnings at $42, short shovel turnings at $45-$46, and heavy turnings at $54.

In rail specialties, couplers, springs and wheels are up $2 to $72, delivered; rail crops, 2 ft and under, are higher at $81-$82. Heavy breakable cast is up at $57, delivered.

New York—With demand strong, brokers have advanced their buying prices on the major open-hearth grades, $1 a ton. They are paying $53-$54 for No. 1 heavy melting and No. 1 bundles, $43-$44 for No. 2 heavy melting, and $41-$42 for No. 2 bundles. They have boosted buying prices on low phos structurals and plate $1 to $55-$56.

In the stainless specialties, the straight chromium grades have been reduced $5 a ton.

Boston — Heavy melting steel prices are stronger. No. 1 grade is up $2 in brokers' offerings. Bor-

(*Please turn to page* 236)

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Iron and Steel Scrap

Consumer prices, per gross tons, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 14	$61.50
Nov. 7	59.17
Oct. Avg.	57.27
Nov. 1955	46.08
Nov. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*62.00-63.00*
No. 2 heavy melting	*53.00-54.00*
No. 1 bundles	*62.00-63.00*
No. 2 bundles	*50.00-51.00*
No. 1 busheling	*62.00-63.00*
Machine shop turnings	*43.00-44.00*
Mixed borings, turnings	*43.00-44.00*
Short shovel turnings	*47.00-48.00*
Cast iron borings	*47.00-48.00*
Cut structurals, 3 ft. lengths	*71.00-72.00*
Heavy turnings	*58.00-59.00*
Punchings & plate scrap	*71.00-72.00*
Electric furnace bundles	*71.00-72.00*

Cast Iron Grades

No. 1 cupola	*52.00-54.00*
Heavy breakable cast	*50.00-51.00*
Unstripped motor blocks	*47.00-48.00*
No. 1 machinery cast	*59.00-60.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*69.00-70.00*
Rails, 2 ft and under	80.00-81.00
Rails, 18 in. and under	81.00-82.00
Rails, random lengths	79.00-80.00
Railroad specialties	73.00-74.00

Stainless Steel Scrap

18-8 bundles & solids	470.00-510.00
18-8 turnings	380.00-400.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	*62.00-63.00*
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	*59.00-60.00*
Charging box cast	*52.00-54.00*
Heavy breakable cast	*50.00-51.00*
Stove plate	55.00-56.00
Unstripped motor blocks	*39.00-40.00*
Brake shoes	*47.00-48.00*
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	68.00-69.00
R.R. malleable	*71.00-72.00*
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	*71.00-72.00*
Railroad specialties	77.00-78.00
Uncut ties	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Broker' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	*43.00-44.00*
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt.	*69.00-70.00*

CHICAGO

No. 1 heavy melting	*61.00-65.00*
No. 2 heavy melting	*51.00-52.00*
No. 1 factory bundles	*67.00-68.00*
No. 1 dealer bundles	*62.00-63.00*
No. 2 bundles	*45.00-46.00*
No. 1 busheling	*61.00-65.00*
Machine shop turnings	*38.00-40.00*
Mixed borings, turnings	*40.00-42.00*
Short shovel turnings	*40.00-42.00*
Cast iron borings	*40.00-42.00*
Cut structurals, 3 ft	*69.00-70.00*
Punchings & plate scrap	*70.00-71.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*66.00-67.00*
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*84.00-84.00*
Rails, 18 in. and under	*84.00-85.00*
Angles, splice bars	*76.00-77.00*
Rails, rerolling	87.00-88.00

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	60.00
No. 2 bundles	40.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	64.00-65.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	35.50-36.50
Machine shop turnings	34.50-35.50
Bar crops and plate	59.00-60.00
Structural & plate, 2 ft	57.00-58.00
Electric furnace bundles	52.00-53.00
Cut foundry steel	50.00-51.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	51.00-52.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	56.00-57.00
Rails, 18 in. and under	74.00-75.00
Rails, rerolling	77.00-78.00
Rails, random lengths	69.00-70.00
Angles, splice bars	66.00-67.00

PHILADELPHIA

No. 1 heavy melting	*59.00*
No. 2 heavy melting	*49.00*
No. 1 bundles	*59.00*
No. 2 bundles	47.00-48.00
No. 1 busheling	*59.00*
Electric furnace bundles	*61.00-62.00*
Mixed borings, turnings	41.00
Machine shop turnings	*42.00*
Short shovel turnings	*45.00-46.00*
Heavy turnings	*54.00*
Structurals & plates	*66.00-67.00*
Couplers, springs, wheels	*72.00*
Rails, crops, 2 ft & under	*81.00-82.00*

Cast Iron Grades

No. 1 cupola	52.00-54.00
Malleable	68.00†
Heavy breakable cast	*57.00*
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*41.00-42.00*
Machine shop turnings	31.00-32.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	37.00-38.00
Low phos. (structural & plate)	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 sheets, clips, solids	475.00-485.00
18-8 borings, turnings	300.00-325.00
430 sheets, clips, solids	*110.00-115.00*
410 sheets, clips, solids	*100.00-105.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*48.50-49.50*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*46.50-47.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*31.00-32.00*
Short shovel turnings	*33.00-34.00*
No. 1 cast	*45.00-45.50*
Mixed cupola cast	41.00-42.00
No. 1 machinery cast	46.00-47.00

BUFFALO

No. 1 heavy melting	*59.00-60.00*
No. 2 heavy melting	*48.00-49.00*
No. 1 bundles	*59.00-60.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*59.00-60.00*
Mixed borings, turnings	*35.00-36.00*
Machine shop turnings	*33.00-34.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00-60.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	59.00-60.00
No. 2 bundles	43.00-44.00
No. 1 busheling	59.00-60.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	37.50-38.50
Short shovel turnings	42.00-43.00
Cast iron borings	37.50-38.50
Low phos. 18 in.	*65.00-66.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	*64.00-65.00*
Rails, 18 in. and under	*80.00-81.00*
Rails, random lengths	*71.00-72.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	55.00
No. 2 heavy melting	45.00
No. 1 bundles	55.00
No. 2 bundles	41.00
No. 1 busheling	55.00
Machine shop turnings	32.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	*46.00*
Heavy breakable cast	*46.00*
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	43.50

Railroad Scrap

No. 1 R.R. heavy melt.	63.00
Rails, 18 in. and under	*83.00*
Rails, rerolling	88.00
Rails, random lengths	*81.50*
Angles, splice bars	*71.00*

SEATTLE

No. 1 heavy melting	54.00-55.00
No. 2 heavy melting	51.00-52.00
No. 1 bundles	51.00-52.00
No. 2 bundles	31.00-33.00
Machine shop turnings	28.00-30.00
Mixed borings, turnings	28.00-30.00
Electric furnace No. 1	60.00-65.00

Cast Iron Grades

No. 1 cupola	50.00-52.00
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	48.00-50.00
Stove plate (f.o.b. plant)	40.00-42.00

LOS ANGLES

No. 1 heavy melting	**57.00**
No. 2 heavy melting	**54.00**
No. 1 bundles	**55.00**
No. 2 bundles	**47.00**
Machine shop turnings	**32.00**

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	**60.00**

SAN FRANCISCO

No. 1 heavy melting	*54.00*
No. 2 heavy melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

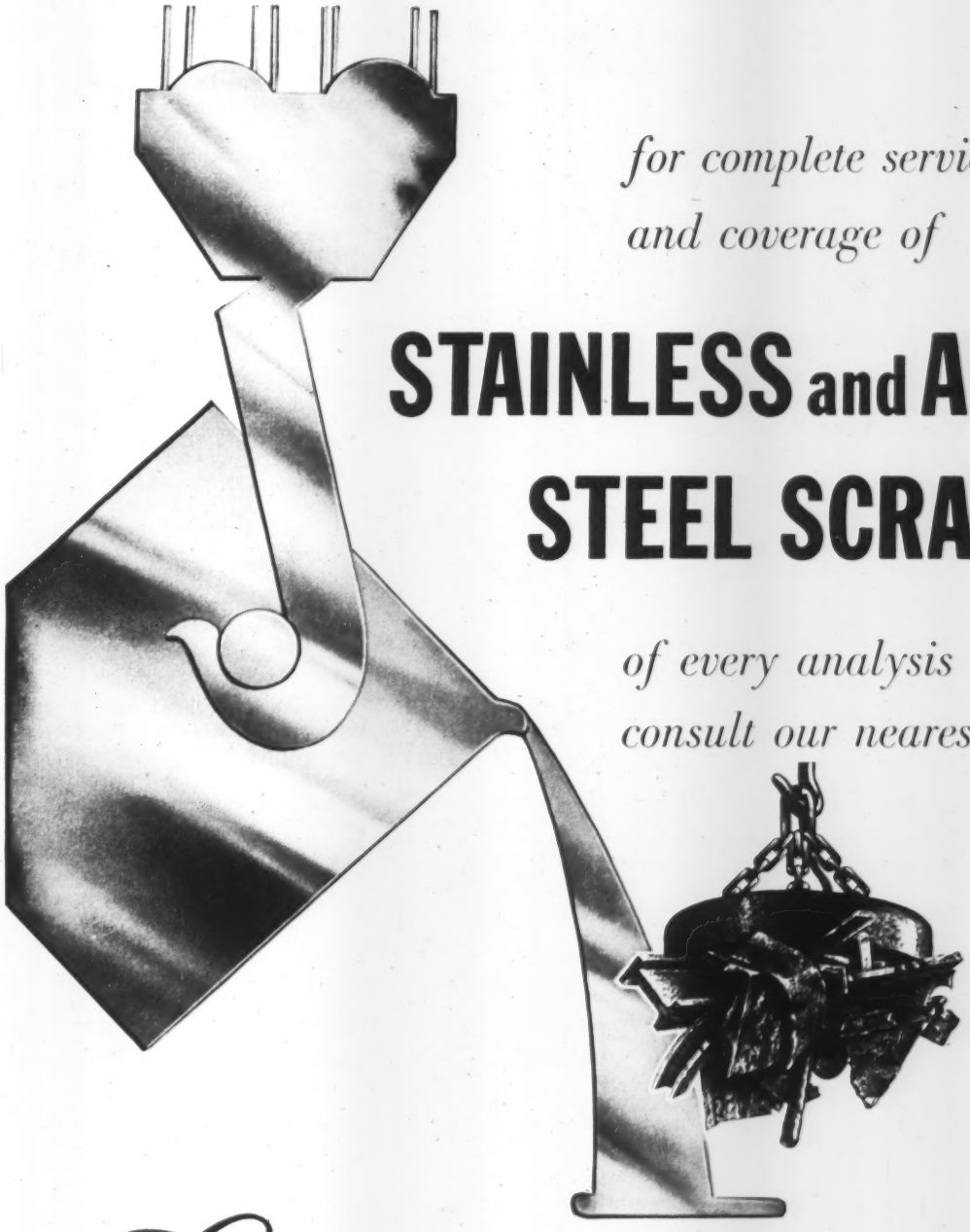
HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Busheling, new factory:	
Prepared	50.00
Unprepared	46.00
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.



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IMPORT & EXPORT — **LIVINGSTON & SOUTHARD, INC.,** 99 Park Ave., New York, N. Y. • *Cable Address:* **FORENTRACO**

Nickel Supply May Tighten

Military uses in first quarter may be greater than anticipated. This raises possibility that announced deferral of stockpile call may be set aside

Nonferrous Metal Prices, Page 234 & 235

NICKEL supply and demand are receiving a thorough going over in Washington.

Defense Secretary Charles E. Wilson may have issued the first warning (see p. 106) to industry last week that the military machine is going to eat up more nickel than had been anticipated.

Results — This may put aside a statement by the Office of Defense Mobilization that first quarter stockpile quotas would be deferred. The importance of having the defense secretary issue a statement on nickel could be a forewarning that if users do not make concerted effort to conserve the metal, controls could be revived.

The government's refusal to provide a direct government loan to a domestic producer interested in producing nickel (rumors say it was Freeport Sulphur Co. or Bethlehem Steel Co.) appears to have acted as a catalyst for the Defense department announcement. The administration feels that tax amortization and a government purchase contract which provides for unusual engineering costs is sufficient incentive to bring in new domestic nickel producers.

Problem—Free World supplies are growing, but domestic demand will probably force a tight supply situation for at least two years.

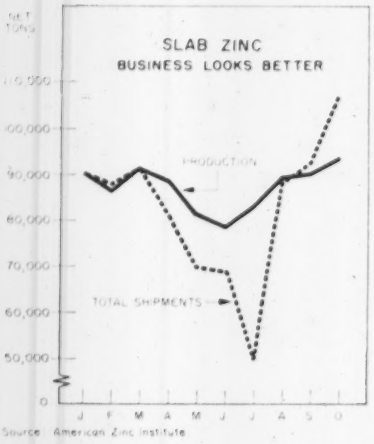
Aluminum Skies Bright

Demand for aluminum mill products is showing added strength. Across the board orders are rising and military demand is high. Pig and ingot sales are at relatively high levels. Demand could mushroom during December as motordom begins to iron the kinks out of its production lines.

Says I. W. Wilson, president, Aluminum Co. of America: "Our faith in the future of aluminum is as high as ever. There is every reason to believe that the growth of the industry will continue at a much greater rate than the national economy."

Zinc Sales Hold

Galvanizers and zinc diecasters are keeping the zinc market buoyant. While there has been no spurt of orders, day-by-day sales continue



Source: American Zinc Institute

to show improvement. "It points," says one zinc producer, "to a strong December and a peak first quarter." With some carmakers going into overtime, diecasters are beginning to brim with confidence.

U.S. domestic zinc shipments totaled 106,848 tons in October, reports the American Zinc Institute. This high mark for the year was given an assist by government purchases for stockpile (21,392 tons). Users received 84,991 tons during October, an increase of 11,849 tons over September.

Copper Market Firms

Primary producers report some order build-up. Detroit is beginning to enter the market slowly for copper-base components. Most mills are still waiting for the sales floodgates to open, but shipments are no worse than they were a month ago. Observes one industry spokesman: "If just a fraction of the people who are looking at the new model cars place orders, the picture for the brass mill industry could change overnight."

Makers of copper tubing continue to be harassed by foreign competition. While domestic producers could reduce prices some (based on the 36 cent a pound level), there is no assurance that foreign firms wouldn't slash them again. This would put domestic producers in the position of making little or no profit on tubing while still being undersold.

Market Memo

• Lead sales remain high. The U.S. market remains firm at 16 cents a pound. Industry analysts are predicting that lead and zinc will continue to receive help in the form of a new type supplementary stockpile program.

NONFERROUS PRICE RECORD

	Price Nov. 14	Last Change		Previous Price	Oct. Avg.	Sept. Avg.	Nov., 1955 Avg.
Aluminum	27.10	Aug.	10, 1956	25.90	27.100	27.100	24.400
Copper	36.00	Oct.	31, 1956	35.00-36.00	38.365	39.500	44.420
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.300
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	35.250	32.500
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Tin	109.00	Nov.	13, 1956	108.375	105.981	103.745	97.825
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.000

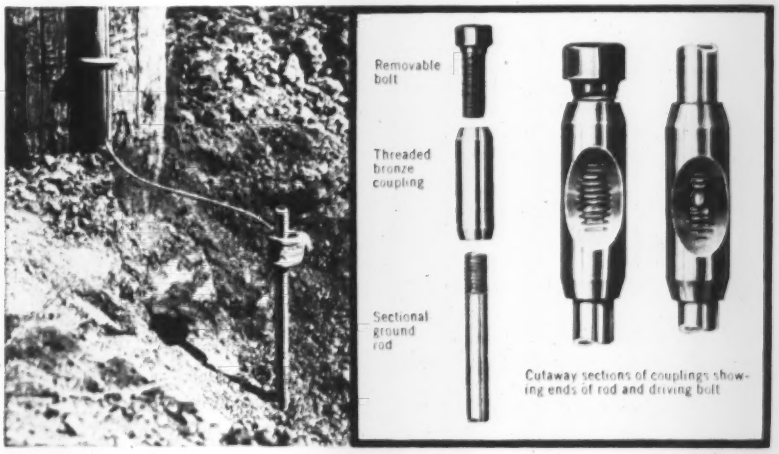
Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.



Cutaway sections of couplings showing ends of rod and driving bolt

Bridgeport Silicon Bronze Gives Ground Rod Couplings Added Strength, Corrosion Resistance and High Conductivity

Lawrenceville Screw Company, Pittsburgh, Pa., makes a variety of products, among them couplings for Copperweld sectional ground rods. These couplings are produced in a variety of diameters and wall thicknesses to fit a wide range of rod diameters. The most popular sectional rod sizes are 8 and 10 feet. Each rod is made with rolled threads at both ends which screw into the couplings, permitting assembly of any number of rod lengths. By coupling together successive rods, the ground rod is made long enough to reach permanently good conducting soils. One such installation exceeds 200 feet in depth.

Machinability and Strength

Lawrenceville has found that Bridgeport Silicon Bronze No. 707 offers the exact combination of properties essential for both production and finished coupling. The uniform structure of this alloy permits efficient, close-tolerance machining. The manufacturer cuts class 2 threads for $2\frac{1}{2}$" on the internal length of the coupling, holding to .003" tolerance on the inside diameter. In addition, the high strength of Silicon Bronze No. 707 is ample to meet the stresses at rod joints and provide secure coupling. Ideal rod conductivity is achieved by the copper-to-copper connection which Silicon Bronze No. 707 provides.

Composition

Silicon Bronze No. 707 is a standard Bridgeport alloy, approximately 91% copper, 7.5% aluminum and 2.5% silicon. It is a high-strength, corrosion-resistant alloy with a machinability rating of 60. Silicon Bronze is 9% lighter and about 50% stronger than annealed Naval Brass rod and has twice the endurance limit. Its tensile strength in the annealed condition is about 90,000 pounds per square inch and its corrosion and wear resistance are, in most instances, superior to brass.

Saves Weight

Forty to 50% lighter than Naval Brass, Silicon Bronze No. 707 offers substantial savings in weight and space without sacrificing resistance to corrosion and wear. Among some of the many items for which Bridgeport Silicon Bronze is well suited are valve parts, wire and cable connectors, nuts, thrust screws, gears, pinions, pump parts, rollers, worm gears and oil-burner nozzles.

Tips on Machining Silicon Bronze

The tensile strength of Silicon Bronze No. 707 in the annealed state is 90,000 psi with a Rockwell hardness of B85. Though its chips are brittle and break off similarly to leaded screw machine brass, the aluminum-silicon content of the alloy makes it tougher and requires a machine some 25 to 30% larger than would normally be used for leaded brass rods.

Use of Correct Coolant

Because friction between the tool and silicon bronze is considerable, the heat generated must be dissipated as quickly as possible. The coolant-lubricant must, therefore, be well directed and in plentiful supply. Generally, best results are achieved with a mineral oil.

Typical parts made from Bridgeport Silicon Bronze

Tool Hardness

Highest possible hardness is recommended for tools used to machine silicon bronze. For example: a form cutter with a C-65 Rockwell lasted four hours longer than the same tool with a C-62 hardness under the same conditions. For long runs, cast metal or carbide-tipped tools offer longer tool life and permit increased machining speeds.

Wide Selection

Silicon Bronze is only one of the many alloys developed by Bridgeport to meet specific, and often unique, requirements. Find out how Bridgeport alloys can help you in the design of a new product, or the more efficient production of a present item. Call your nearest Bridgeport Sales Office for experienced helpful service and prompt delivery. (0248)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ◆ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97.99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: Firat reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $253-$255 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 109.00; prompt, 108.75.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb, flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.50; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00-26.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.355; l.c.l. 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh). Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C.R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	120	190

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	58.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.63b	54.86c	....	57.82	32.000	32.000	31.250
Yellow Brass	49.44	40.17d	49.98	52.35	24.625	24.375	22.625
Low Brass, 80%	52.65	52.59	53.19	55.46	27.375	27.125	26.625
Red Brass, 85%	53.79	53.73	54.33	56.60	28.500	28.250	27.750
Com. Bronze, 90%	55.48	55.42	56.02	58.04	29.500	29.250	28.750
Manganese Bronze	57.13	51.23	61.47	....	23.000	22.750	22.250
Muntz Metal	51.44	47.25	....	....	23.125	22.875	22.375
Naval Brass	53.39	47.70	60.45	56.55	23.000	22.750	22.250
Silicon Bronze	61.44	60.63	61.48	63.36	31.250	31.000	30.250
Nickel Silver, 10%	65.16	69.20g	67.49	....	30.125	29.875	15.063
Phos. Bronze, A, 5%	76.25	76.75	76.75	77.93	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 28.00-28.50; No. 2 heavy copper and wire, 26.50-27.00; light copper, 24.00-24.50; No. 1 composition red brass, 24.50-25.00; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 13.50-14.00; new brass clippings, 20.50-21.00; light brass, 14.00-14.50; heavy yellow brass, 15.50-16.00; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.00-18.50; brass pipe, 19.00-20.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50.

Monel: Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.00-19.00; 3003 clippings, 18.00-19.00; 6151 clippings, 18.00-19.00; 5052 clippings, 18.00-18.50; 2014 clippings, 17.00-18.50; 2017 clippings, 17.00-18.50; 2024 clippings, 17.00-18.50; mixed clippings, 17.00-17.50; old sheets, 15.50-16.00; old cast, 15.50-16.00; clean old cable (free of steel), 18.00; borings and turnings, 15.75-16.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 31.00; No. 2 heavy copper and wire, 29.50; light copper, 27.25; refinery brass (60% copper) per dry copper content, 28.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 31.00; No. 2 heavy copper and wire, 29.50; light copper, 27.25; No. 1 composition borings, 26.50; No. 1 composition solids, 27.00; heavy yellow brass solids, 19.00; yellow brass turnings, 17.50; radiators, 21.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.29; oval, 53.42, 5000-10,000 lb; electrodeposited, 45.78; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 126.50; 200-499 lb, 125.00; 500-999 lb, 125.40; 1000 lb or more, 124.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums. **Chromic Acid:** Less than 10,000 lb, 30.25; over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 75.30; 100-600 lb, 66.50; 700-1900 lb, 64.00; 2000-9900 lb, 62.30; 10,000 lb or more, 61.10.

Stannous Chloride (anhydrous): Less than 25 lb, 173.20; 25 lb, 138.20; 100 lb, 123.80; 400 lb, 120.80; 5200-19,600 lb, 108.60; 20,000 lb or more, 96.40.

Stannous Sulphate: Less than 50 lb, 135.60; 50 lb, 105.60; 100-1900 lb, 103.60; 2000 lb or more, 101.60.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

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LAYNE & BOWLER EXPORT CORPORATION 650 South Grand Avenue, Los Angeles, a subsidiary

(*Concluded from page 229*)

ings and turnings are $1 higher.

Buffalo — Principal grades of steel scrap are up $2 to $4 based on new local mill purchases and out-of-district shipments. Local mills bought No. 2 heavy melting at $49, and No. 2 bundles at $44—up $4 on heavy melting and $2 on the bundles.

No. 1 heavy melting and No. 1 bundles have advanced $2 to $59-$60. The increase is based on out-district sales. New local business would probably bring the same price.

Blast furnace grades joined in the advance, going up $1 to $2 a ton. Cast grades are unchanged.

Cleveland — Although new mill buying has been absent here and in the Valley the past 10 days or so, the market on the steelmaking grades of scrap continues strong. Prices are unchanged on the steel grades. Cut foundry steel scrap, however, is up a couple dollars a ton, while some cast scrap items are quoted $1 higher.

Detroit—The scrap market is generally unchanged. Trading is less active, a situation common to periods between the issuance of automotive lists.

St. Louis—Scrap is scarce. Some speculation and wild buying are reported. Advances of $3 a ton show in charging box and heavy breakable cast. Sharp rises are noted in certain railroad scrap items, ranging from $1.50 to $4 a ton. But most categories are unchanged here. The local area mills are said to be paying premium prices for out-of-town scrap.

Birmingham—The only strength in the market here is in electric furnace grades. Open hearth and cast grades are weak, with much of the tonnage moving going to northern mills or for export.

Most of the cast iron pipe manufacturers are experiencing their usual seasonal drop in orders. Only two of the major consumers are buying their normal tonnage of cast scrap. Some companies have cut back to a three-day week.

The export market at some ports improved last week with No. 1 heavy melting quoted $59-$60, delivered, at some Gulf ports.

Cincinnati—The market is firm on strong demand, with brokers quoting No. 1 heavy melting at $59-$60. Several upward price adjustments in railroad scrap lists were made last week.

San Francisco — No. 1 heavy melting steel was advanced $1 a ton last week. Other grades held unchanged.

Los Angeles—The market undertone continues strong. Mill purchases and exports to the Orient are increasing. Shortages of steelmaking grades are less severe than had been anticipated. Most dealers report tonnage is more plentiful.

Seattle — Current scrap prices are attracting heavy shipments from the interior. Considerable material is coming from Alaska.

Washington—Domestic consumption of ferrous materials (scrap and pig iron) in September exceeded the total consumed during any previous like month on record, reports the Census Bureau.

Total melt in the month consisted of 6,232,000 tons of scrap and 6,053,000 tons of pig iron, 50.7 per cent and 49.3 per cent, compared with 54.1 per cent and 45.9 per cent, in August.

Stocks of scrap held by consumers at the end of September amounted to 6,058,000 tons, a decrease of 3 per cent from the previous month. Stocks of pig iron were 2,145,000 tons, up 3 per cent over those held Aug. 31.

IMMEDIATE SALE

3—10,000-Gal. Tanks

3— 8,000-Gal. Tanks

Tank car tanks—some coiled

Rail & Industrial Equip. Co.

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1000 to 1500 Ton

Hobbing Press

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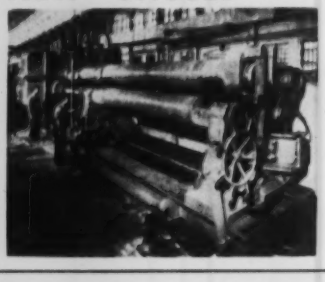
FERROUS METALLURGIST: TWENTY YEARS experience in steel-making, rolling, processing and inspection. Location unimportant. Write Box 486, STEEL, Penton Bldg., Cleveland 13 Ohio.

NEW UNUSED — 4 Roll Plate Bending & Straightening Machine



Built in 1945—Replacement Price $150,000.00—Can be bought for less than ½

Aetna Standard—Serial #12280—Capacity 13′ x ¾″ thick plate

MACHINE WILL ROLL 13′ WIDE X ¾″ THICK MINIMUM 32″ DIAMETER

Length of rolls 13′6″
Diameter of rolls 18″
50 H.P. main drive
15 H.P. motor for top roll elevation
5 H.P. motor for fourth roll elevation
Powered drop end
1 H.P. lubricating pump
2 extra rolls and many other extra parts

Total weight 231,500 lbs.

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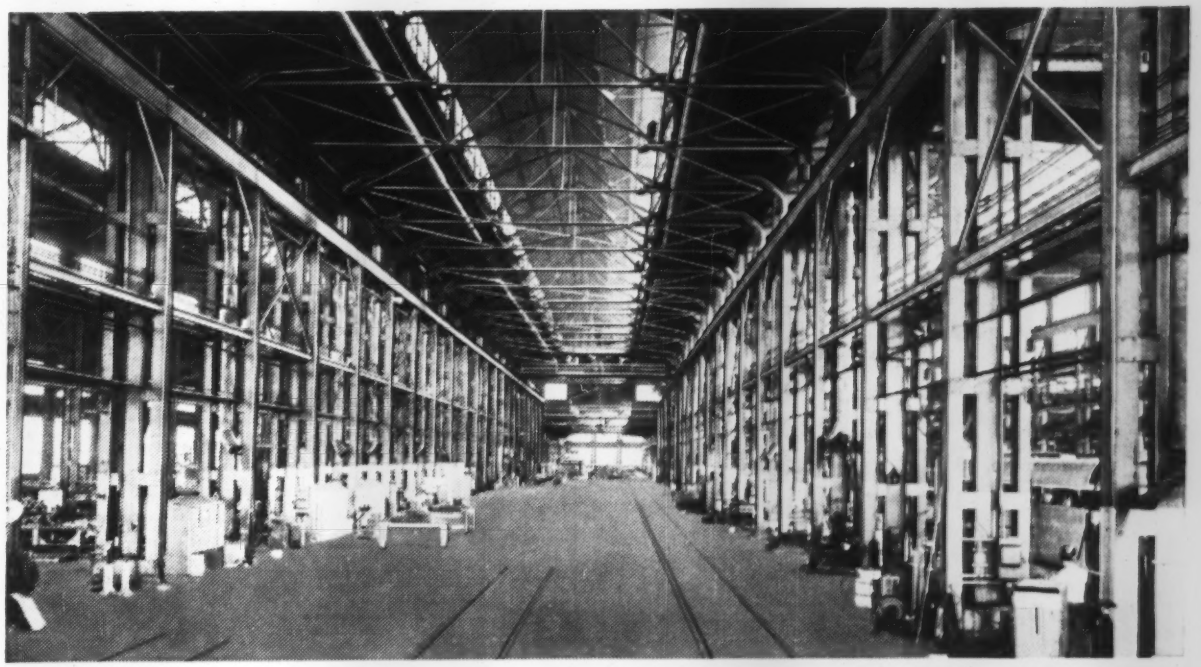

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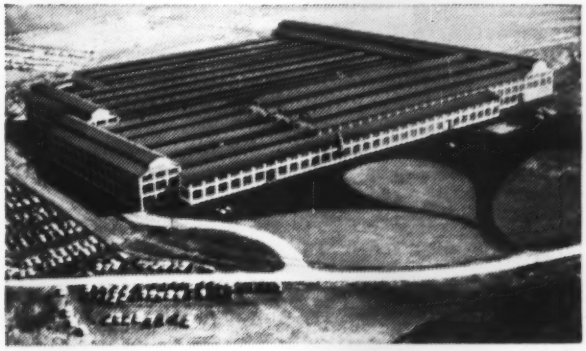
10 MAJOR BUILDINGS COVERING 2,300,000 SQ. FT. AVAILABLE IN UNITS FROM 30,000 TO 1,100,000 SQ. FT.

These buildings are ideal for practically any type of industry and are geared to efficient, economical operation. Buildings are available match-marked and loaded for re-erection or divided to suit your specific requirements.

- Lengths from 173 to 800 ft.
- Bays from 37 to 100 ft. wide. Clear span.
- 129 overhead traveling cranes.
- Buildings completely covered with 10 to 150 ton cranes.
- Buildings perfect for straight line production.
- Power sub-station equipment (includes transformers, switch gears, rotary converters and motor generator sets).
- Modern boiler plant. 600,000 lbs. per hr. of steam capacity—oil and coal fired. Built 1946.



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From 3 ton to 150 ton capacity. 40 ft. to 80 ft. span. Immediately Available. Sold either separately or with building structure. These cranes are cab operated, 230 volt D.C. operation. Several of these cranes have auxiliary trolleys.

Detailed engineering data is available upon request. For additional information, write, wire or phone

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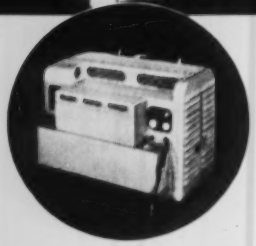
	READY-POWER UNITS	POWER TYPE A	POWER TYPE B
Simplicity of Electric Drive	YES	yes	no
Maximum Power for Unlimited Periods	YES	no	yes
Off-the-Truck Power Unit Maintenance and Adjustment	YES	yes	no
Power That's Interchangeable from Truck to Truck	YES	yes	no
Power That Lasts for the Life of the Truck	YES	no	yes



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Title

Company

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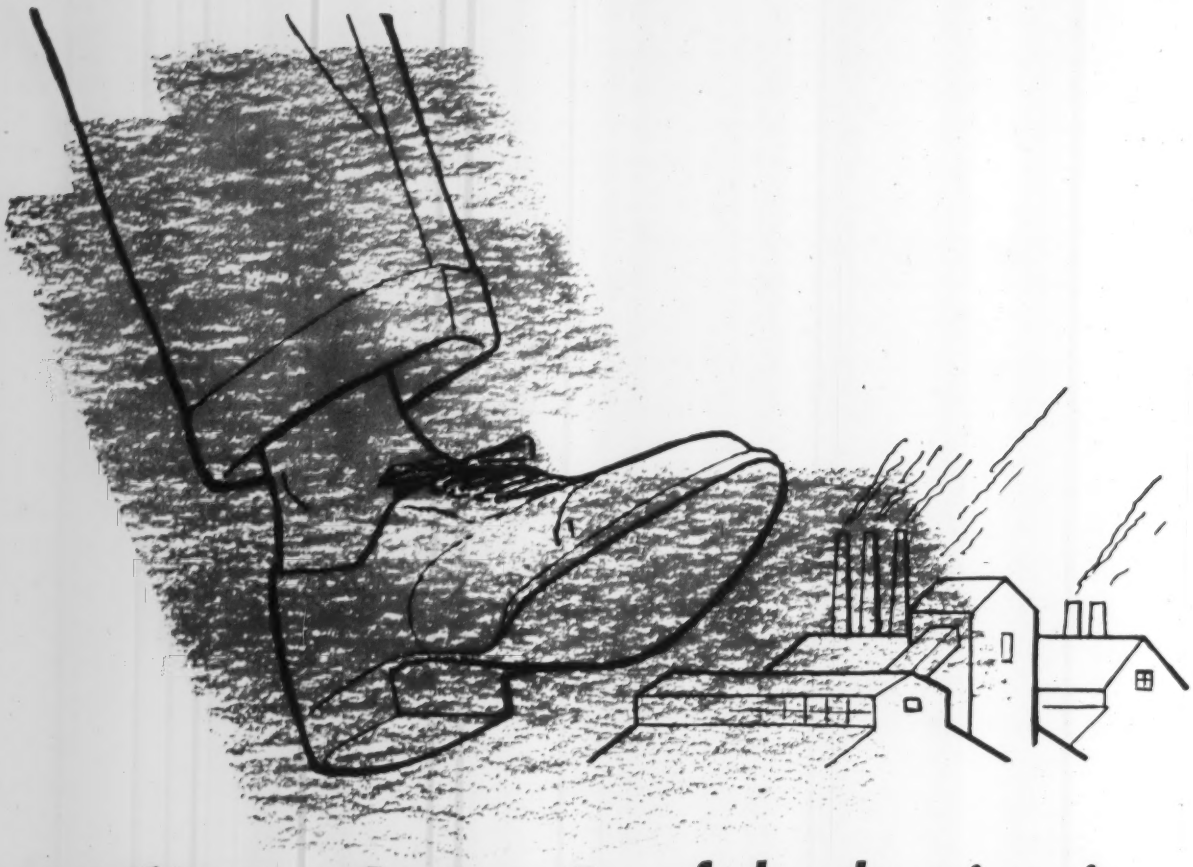

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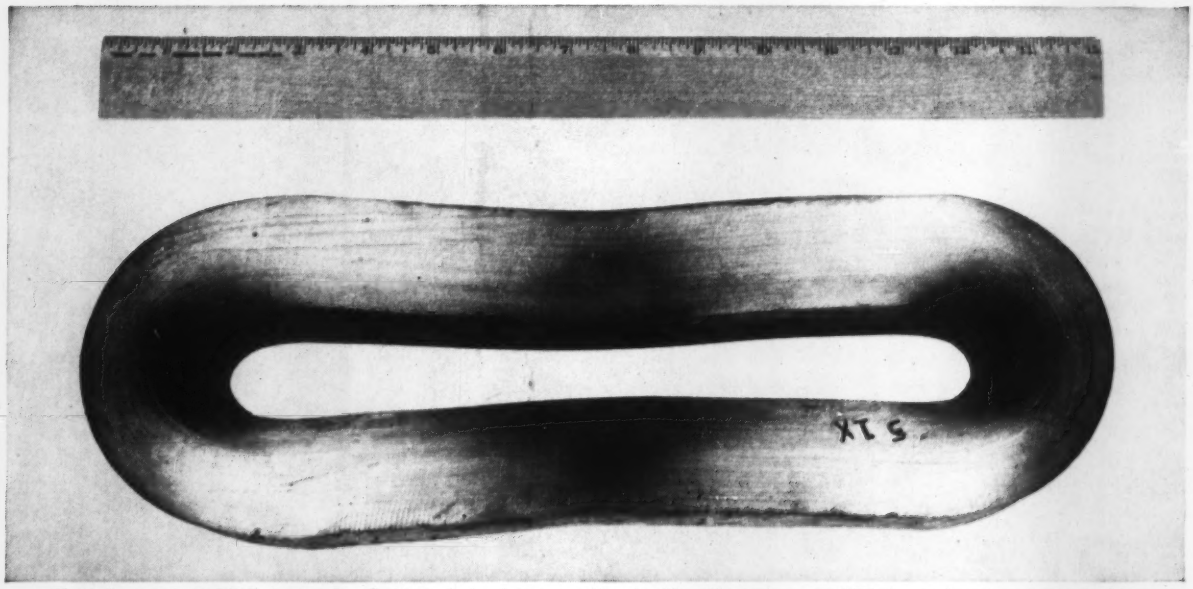
GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



Flattening test of 10½" O.D. by 1.580" wall of 18-8 Cb showing the excellent ductility of large, heavy-wall Timken high temperature steel tubing.

To get the best possible tube life per dollar: *Ask the experts!*

This month's report is on:

SICROMO 7

Suggested as a substitute for steels of the 5.0 per cent chromium type for applications which require increased resistance to corrosion by hot petroleum products.

ONE OF 24 TIMKEN HIGH TEMPERATURE STEELS

Carbon	Sicromo 2	Sicromo 5S	18-8 Ti
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	16-13-3
DM-2	2½% Cr.-1% Mo.	Sicromo 7	25-20*
Silmo	Sicromo 3	Sicromo 9M	25-12*
DM	4-6% Cr.-Mo.	18-8 Stainless	35-15**
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	16-25-6**

** Available as seamless tubing on an experimental basis only.*
***Not available as seamless tubing.*

SEVERAL analyses of high-temperature steels may solve your temperature, pressure, corrosion, and oxidation problems. But to get the best life/cost ratio —the best possible tube life per dollar—there's actually only one analysis that's best for you.

To get it, ask the experts—metallurgists of The Timken Roller Bearing Company. They're recognized authorities on high-temperature steels—with more than 25 years of high-temperature steel research and experience behind them. From the 24 different analyses at their disposal, let them help you choose the *one* tube steel analysis that's best for your particular job. Whatever one you choose, you can be assured of uniform quality. That's because the Timken Company rigidly controls quality from melt shop through final tube inspection. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING